

=> fil wpix  
FILE 'WPIX' ENTERED AT 13:25:48 ON 20 MAY 2008  
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FILE LAST UPDATED: 19 MAY 2008 <20080519/UP>  
MOST RECENT THOMSON SCIENTIFIC UPDATE: 200832 <200832/DW>  
DERWENT WORLD PATENTS INDEX SUBSCRIBER FILE, COVERS 1963 TO DATE

>>> IPC Reform backfile reclassifications have been loaded to the end of March 2008. No update date (UP) has been created for the reclassified documents, but they can be identified by 20060101/UPIC and 20061231/UPIC, 20070601/UPIC, 20071001/UPIC, 20071130/UPIC and 20080401/UPIC.  
ECLA reclassifications to April and US national classifications to the end of January 2008 have also been loaded. Update dates 20080401/UPEC and /UPNC have been assigned to these. <<<

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>>> HELP for European Patent Classifications see HELP ECLA, HELP ICO <<<

>>> Updated PDF files in the following links:  
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[http://www.stn-international.de/stndatabases/details/epc\\_0803.zip](http://www.stn-international.de/stndatabases/details/epc_0803.zip)  
Supplement of all changed ECLA items:  
[http://www.stn-international.de/stndatabases/details/ecla\\_0804s.zip](http://www.stn-international.de/stndatabases/details/ecla_0804s.zip) <<  
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>>> Please note that the COPYRIGHT notification has changed <<<

=> d 134 que

L3 QUE ABB=ON PLU=ON POLYMER OR COPOLYMER OR RESIN HOMOPOLYMER OR TERPOLYMER  
L4 QUE ABB=ON PLU=ON POLYETHYLENE OR PE OR POLYPROPYLENE OR PP OR POLYIMIDE OR PI OR POLYSULFONE OR PSU OR POLYURETHANE OR PUR  
L5 QUE ABB=ON PLU=ON POLYVINYLCHLORIDE OR PVC OR CELLULOSE OR NYLON OR POLYACRYLONITRILE OR PAN OR POLYVINYLIDENE(W)FLUORIDE OR POLY(W)VINYLLIDENE(W)FLURIDE OR PVDF  
L6 QUE ABB=ON PLU=ON POLYVINYLCHLORIDE OR PVC OR CELLULOSE OR NYLON OR POLYACRYLONITRILE OR PAN  
L7 QUE ABB=ON PLU=ON (POLYVINYLIDENE OR POLY(W)VINYLLIDENE)(W)FLURIDE OR PVDF OR POLYTETRAFLUOROETHYLENE OR PTFE  
L8 QUE ABB=ON PLU=ON (INORG# OR INORGANIC) (2A) (COMPOUND OR MATERIAL OR CHEMICAL OR ADDITIVE OR AGENT)  
L9 QUE ABB=ON PLU=ON SILICA# OR (SILICON OR SI) (W) (OXIDE# OR DIOXIDE# OR OXIDIZ?) OR SIO2  
L10 QUE ABB=ON PLU=ON TALC OR MAGNESIUM(A)SILICATE OR TALCUM  
L11 QUE ABB=ON PLU=ON ALUMINA OR AL2O3 OR (ALUMINUM OR AL)

(W)OXIDE#

L12 QUE ABB=ON PLU=ON LIALO2 OR TIO2 OR (TITANIUM OR TI) (A)  
(OXIDE OR DIOXIDE) OR ZEOLITE OR ALUMINOSILICATE

L13 163398 SEA FILE=HCAPLUS ABB=ON PLU=ON (L3 OR L4 OR L5 OR L6  
OR L7) (2A) (FILM OR THINFILM)

L16 QUE ABB=ON PLU=ON MORPHOL?

L18 QUE ABB=ON PLU=ON ELECTROLY?

L21 QUE ABB=ON PLU=ON (ETHLENE OR PROPYLENE OR DIMETHYL OR  
DIETHYL OR METHYLETHYL) (A) CARBONATE

L22 QUE ABB=ON PLU=ON TETRAHYDROFURAN OR 2(W) METHYLTETRAHY  
DROFURAN OR DIMETHOXYETHANE OR METHYLFORMATE OR ETHYLFORM  
ATE OR (METHYL OR ETHYL) (A) FORMATE OR GAMMA(W) BUTYROLACTO  
NE

L26 2029 SEA FILE=WPIX ABB=ON PLU=ON (PORO? OR PORE OR PERVIOUS)  
(2A) L13

L27 203 SEA FILE=WPIX ABB=ON PLU=ON L26 AND (L8 OR L9 OR L10  
OR L11 OR L12)

L28 1 SEA FILE=WPIX ABB=ON PLU=ON L27 AND L16

L29 49 SEA FILE=WPIX ABB=ON PLU=ON (L27 OR L28) AND L18

L30 22 SEA FILE=WPIX ABB=ON PLU=ON (L28 OR L29) AND (L21 OR  
L22)

L31 76 SEA FILE=WPIX ABB=ON PLU=ON (FIRST? OR 1ST OR 1(W) ST  
OR BASE OR PRIMARY?) (2A) L26

L32 41 SEA FILE=WPIX ABB=ON PLU=ON (MULTI OR MULTIPL? OR  
PLURAL? OR TWO OR THREE OR NUMEROUS? OR SEVERAL? OR  
SERIES?) (2A) L26

L33 1 SEA FILE=WPIX ABB=ON PLU=ON L30 AND (L31 OR L32)

L34 1 SEA FILE=WPIX ABB=ON PLU=ON L28 OR L33

=> d 134 ifull

L34 ANSWER 1 OF 1 WPIX COPYRIGHT 2008 THOMSON REUTERS on STN  
ACCESSION NUMBER: 2004-820229 [81] WPIX  
DOC. NO. CPI: C2004-285174 [81]  
DOC. NO. NON-CPI: N2004-647475 [81]  
TITLE: Composite polymer electrolyte for lithium  
secondary battery for electronic devices, e.g.  
camcorders, comprises composite film structure  
having polymer films with different  
morphologies

DERWENT CLASS: A85; L03; W01; W04; X16

INVENTOR: CHANG S; CHANG S H; JANG S H; KIM G M; KIM K M;  
KIMU K; LEE Y G; RYU G S; RYU K S; RYOO G S

PATENT ASSIGNEE: (CHAN-I) CHANG S H; (ELTE-N) ELECTRONICS & TELECOM  
RES INST; (KIMK-I) KIM K M; (KOEL-N) KOREA  
ELECTRONIC COMMUNICATION; (KOEL-N) KOREA  
ELECTRONICS TELECOM; (LEEY-I) LEE Y G; (RYUK-I) RYU  
K S; (KOEL-N) KOREA ELECTRONICS & TELECOM RES INST

COUNTRY COUNT: 4

PATENT INFORMATION:

PATENT NO	KIND	DATE	WEEK	LA	PG	MAIN IPC
US 20040214088	A1	20041028	(200481)*	EN	10	[5]
JP 2004327422	A	20041118	(200481)	JA	11	
KR 2004092188	A	20041103	(200517)	KO		
CN 1610169	A	20050427	(200562)	ZH		
KR 496641	B	20050620	(200659)	KO		

## APPLICATION DETAILS:

PATENT NO	KIND	APPLICATION	DATE
US 20040214088 A1		US 2003-748363	20031229
KR 2004092188 A		KR 2003-26419	20030425
JP 2004327422 A		JP 2003-431458	20031225
CN 1610169 A		CN 2003-10125472	20031231
KR 496641 B		KR 2003-26419	20030425

## FILING DETAILS:

PATENT NO	KIND	PATENT NO
KR 496641	B Previous Publ	KR 2004092188 A

PRIORITY APPLN. INFO: KR 2003-26419 20030425

## INT. PATENT CLASSIF.:

MAIN: H01M010-40  
 IPC RECLASSIF.: H01B0001-06 [I,A]; H01B0001-06 [I,C]; H01B0013-00 [I,A]; H01B0013-00 [I,C]; H01M0010-36 [I,C]; H01M0010-40 [I,A]  
 ECLA: H01M0010-40B  
 ICO: T01M0010:40L; T01M0300:00K1; T01M0300:00K2  
 USCLASS NCLM: 429/309.000  
 NCLS: 429/314.000; 429/316.000; 429/317.000

## BASIC ABSTRACT:

US 20040214088 A1 UPAB: 20060122

NOVELTY - A composite polymer electrolyte (10) comprises a composite film structure having a first porous polymer film (12) with micro-scale morphology and a second porous polymer film (14) with submicro-scale morphology coated on the first porous polymer film; and an electrolyte solution (16) impregnated into the composite film structure.

DETAILED DESCRIPTION - An INDEPENDENT CLAIM is also included for a method of manufacturing a composite polymer electrolyte for a lithium secondary battery comprising preparing a first polymer film made of a first porous polymer with a first pore size; uniformly dissolving a single ion conductor, an inorganic material, and a second porous polymer with a second pore size smaller than the first pore size in a co-solvent in a predetermined ratio to produce a solution; coating the first polymer film with the solution to form a second polymer film on the first polymer film; and impregnating the first and second polymer films with an electrolyte solution.

USE - For lithium secondary battery for electronic devices, e.g. camcorders and cellular phones.

ADVANTAGE - The invented composite polymer electrolyte has increased mechanical properties and enhances ionic conductivity and the charge/discharge cycle stability.

DESCRIPTION OF DRAWINGS - The figure is a schematic view of a composite polymer electrolyte.

Electrolyte (10)

Polymer films (12, 14)

Electrolyte solution (16) TECHNOLOGY FOCUS:

INORGANIC CHEMISTRY - Preferred Material: The

inorganic material is silica,

talc, alumina, gamma-lithium aluminate,

titanium dioxide, zeolite, molybdenum

phosphate hydrate or tungsten phosphate hydrate. The

electrolyte solution comprises lithium salt from lithium

perchlorate, lithium triflate, lithium hexafluorophosphate, lithium

tetrafluoroborate or lithium trifluoromethanesulfonylimide.

Preferred Composition: The inorganic material is added in an amount of 1-100 weight% based on the total weight of the polymer of the second porous matrix. The lithium salt is dissolved in the electrolyte solution at 1-200 weight% based on the total weight of the polymer of the first polymer matrix and the second polymer matrix.

ORGANIC CHEMISTRY - Preferred Material: The inorganic material is silica, talc, alumina, gamma-lithium aluminate, titanium dioxide, zeolite, molybdenum phosphate hydrate or tungsten phosphate hydrate. The electrolyte solution comprises lithium salt from lithium perchlorate, lithium triflate, lithium hexafluorophosphate, lithium tetrafluoroborate or lithium trifluoromethanesulfonylimide.

Preferred Composition: The inorganic material is added in an amount of 1-100 weight% based on the total weight of the polymer of the second porous matrix. The lithium salt is dissolved in the electrolyte solution at 1-200 weight% based on the total weight of the polymer of the first polymer matrix and the second polymer matrix.

ORGANIC CHEMISTRY - Preferred Component: The electrolyte solution is made of ethylene carbonate, propylene carbonate, dimethyl carbonate, diethyl carbonate, methylethyl carbonate, tetrahydrofuran, 2-methyltetrahydrofuran, dimethoxyethane, methyl formate, ethyl formate and/or gamma-butyrolactone. The co-solvent is ethanol, methanol, isopropyl alcohol, acetone, dimethylformamide, dimethylsulfoxide, and/or N-methylpyrrolidone.

POLYMERS - Preferred Material; The first porous polymer film is made of polyethylene, polypropylene, polyimide, polysulfone, polyurethane, PVC, cellulose, nylon, polyacrylonitrile, polyvinylidene fluoride, polytetrafluoroethylene and/or its copolymer. The second porous polymer film is made of vinylidene fluoride based polymer, an acrylate based polymer and/or its copolymer. It is also made of a copolymer of vinylidene fluoride and hexafluoropropylene, a copolymer of vinylidene fluoride and trifluoroethylene, a copolymer of vinylidene fluoride and tetrafluoroethylene, polymethylacrylate, polyethylacrylate, polymethylmethacrylate, polyethylmethacrylate, polybutylacrylate, polybutylmethacrylate, polyvinylacetate, polyethylene oxide, polypropylene oxide and/or its copolymer.

Preferred Property: The first polymer film has a thickness of 10-25 microns and the second polymer film has a thickness of 0.5-10 microns.

Preferred Composition: The electrolyte solution is impregnated into the first and second polymer films at 1-1000 weight% based on the total weight of the polymer of the first and second polymer films.

Preferred Component: The second porous polymer film comprises an inorganic material.

FILE SEGMENT: CPI; EPI  
MANUAL CODE: CPI: A08-S02; A11-B05D; A11-C; A11-C04B2; A12-E06;  
A12-S06C1; L03-E01C2; L03-E03  
EPI: W01-C01D3C; W01-C01E5A; W04-M01B1; W04-M01P5;  
X16-B01F; X16-J01; X16-J08

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FILE COVERS 1907 - 20 May 2008 VOL 148 ISS 21  
FILE LAST UPDATED: 19 May 2008 (20080519/ED)

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FILE COVERS APRIL 1973 TO JANUARY 31, 2008

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THE ABSTRACT (/AB), BASIC INDEX (/BI) AND TITLE (/TI) FIELDS >>>

=> d 160 que

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L4 QUE ABB=ON PLU=ON POLYETHYLENE OR PE OR POLYPROPYLENE OR PP OR POLYIMIDE OR PI OR POLYSULFONE OR PSU OR POLYURETHANE OR PUR

L5 QUE ABB=ON PLU=ON POLYVINYLCHLORIDE OR PVC OR CELLULOSE OR NYLON OR POLYACRYLONITRILE OR PAN OR POLYVINYLIDENE(W)FLUORIDE OR POLY(W)VINYLDENE(W)FLURIDE OR PVDF

L6 QUE ABB=ON PLU=ON POLYVINYLCHLORIDE OR PVC OR CELLULOSE OR NYLON OR POLYACRYLONITRILE OR PAN

L7 QUE ABB=ON PLU=ON (POLYVINYLIDENE OR POLY(W)VINYLDENE)(W)FLURIDE OR PVDF OR POLYTETRAFLUOROETHYLENE OR PTFE

L8 QUE ABB=ON PLU=ON (INORG# OR INORGANIC) (2A) (COMPOUND OR MATERIAL OR CHEMICAL OR ADDITIVE OR AGENT)

L9 QUE ABB=ON PLU=ON SILICA# OR (SILICON OR SI) (W) (OXIDE# OR DIOXIDE# OR OXIDIZ?) OR SIO2

L10 QUE ABB=ON PLU=ON TALC OR MAGNESIUM(A)SILICATE OR TALCUM

L11 QUE ABB=ON PLU=ON ALUMINA OR AL2O3 OR (ALUMINUM OR AL) (W)OXIDE#

L12 QUE ABB=ON PLU=ON LIALO2 OR TIO2 OR (TITANIUM OR TI) (A) (OXIDE OR DIOXIDE) OR ZEOLITE OR ALUMINOSILICATE

L13 163398 SEA FILE=HCAPLUS ABB=ON PLU=ON (L3 OR L4 OR L5 OR L6 OR L7) (2A) (FILM OR THINFILM)

L14 3045 SEA FILE=HCAPLUS ABB=ON PLU=ON (PORO? OR PORE OR PERVIOUS) (2A)L13

L15 336 SEA FILE=HCAPLUS ABB=ON PLU=ON L14 AND (L8 OR L9 OR L10 OR L11 OR L12)

L16 QUE ABB=ON PLU=ON MORPHOL?

L17 18 SEA FILE=HCAPLUS ABB=ON PLU=ON L15 AND L16

L18 QUE ABB=ON PLU=ON ELECTROLY?

L19 43 SEA FILE=HCAPLUS ABB=ON PLU=ON (L15 OR L17) AND L18

L20 4 SEA FILE=HCAPLUS ABB=ON PLU=ON L17 AND L19

L21 QUE ABB=ON PLU=ON (ETHLENE OR PROPYLENE OR DIMETHYL OR DIETHYL OR METHYLETHYL) (A)CARBONATE

L22 QUE ABB=ON PLU=ON TETRAHYDROFURAN OR 2(W)METHYLTETRAHYDROFURAN OR DIMETHOXYETHANE OR METHYLFORMATE OR ETHYLFORMATE OR (METHYL OR ETHYL) (A)FORMATE OR GAMMA(W)BUTYROLACTONE

L23 7 SEA FILE=HCAPLUS ABB=ON PLU=ON L19 AND (L21 OR L22)

L24 10 SEA FILE=HCAPLUS ABB=ON PLU=ON L20 OR L23

L26 2029 SEA FILE=WPIX ABB=ON PLU=ON (PORO? OR PORE OR PERVIOUS) (2A)L13

L31 76 SEA FILE=WPIX ABB=ON PLU=ON (FIRST? OR 1ST OR 1(W)ST OR BASE OR PRIMARY?) (2A)L26

L32 41 SEA FILE=WPIX ABB=ON PLU=ON (MULTI OR MULTIPL? OR PLURAL? OR TWO OR THREE OR NUMEROUS? OR SEVERAL? OR SERIES?) (2A)L26

L36 297 SEA FILE=COMPENDEX ABB=ON PLU=ON (PORO? OR PORE OR PERVIOUS) (2A)L13

L37 24 SEA FILE=COMPENDEX ABB=ON PLU=ON L36 AND (L8 OR L9 OR L10 OR L11 OR L12)

L38 7 SEA FILE=COMPENDEX ABB=ON PLU=ON L37 AND L16

L39 1 SEA FILE=COMPENDEX ABB=ON PLU=ON (L37 OR L38) AND L18

L41 2 SEA FILE=COMPENDEX ABB=ON PLU=ON (L37 OR L38 OR L39) AND (L31 OR L32)

L42 10 SEA FILE=COMPENDEX ABB=ON PLU=ON L38 OR L39 OR L41

L43 3 SEA FILE=COMPENDEX ABB=ON PLU=ON L42 AND PY<=2004

5/20/2008

10/748,363

7

L44 991 SEA FILE=JAPIO ABB=ON PLU=ON (PORO? OR PORE OR  
PERVIOUS) (2A)L13  
L45 33 SEA FILE=JAPIO ABB=ON PLU=ON L44 AND (L8 OR L9 OR L10  
OR L11 OR L12)  
L47 7 SEA FILE=JAPIO ABB=ON PLU=ON L45 AND L18  
L49 1 SEA FILE=JAPIO ABB=ON PLU=ON (L45 OR L47) AND (L31 OR  
L32)  
L50 8 SEA FILE=JAPIO ABB=ON PLU=ON (L47 OR L49) AND PY<=2004  
  
L51 263 SEA FILE=INSPEC ABB=ON PLU=ON (PORO? OR PORE OR  
PERVIOUS) (2A)L13  
L52 41 SEA FILE=INSPEC ABB=ON PLU=ON L51 AND (L8 OR L9 OR L10  
OR L11 OR L12)  
L53 10 SEA FILE=INSPEC ABB=ON PLU=ON L52 AND L16  
L54 4 SEA FILE=INSPEC ABB=ON PLU=ON (L52 OR L53) AND L18  
L56 3 SEA FILE=INSPEC ABB=ON PLU=ON (L52 OR L53 OR L54) AND  
(L31 OR L32)  
L57 7 SEA FILE=INSPEC ABB=ON PLU=ON L54 OR L56  
L58 1 SEA FILE=HCAPLUS ABB=ON PLU=ON (KR2003-26419/AP OR  
CN1610169/PN OR CN2003-10125472/AP OR JP2003-431458/AP  
OR JP2004327422/PN OR KR2004092188/PN OR KR496641/PN OR  
US2003-748363/AP OR US20040214088/PN)  
L59 9 SEA FILE=HCAPLUS ABB=ON PLU=ON L24 NOT L58  
L60 23 DUP REM L59 L43 L50 L57 (4 DUPLICATES REMOVED)

=> d l60 iall 1-23

YOU HAVE REQUESTED DATA FROM FILE 'COMPENDEX, JAPIO, INSPEC, HCAPLUS' - CO  
NTINUE? (Y)/N:y

L60 ANSWER 1 OF 23 INSPEC (C) 2008 IET on STN  
ACCESSION NUMBER: 2007:9393116 INSPEC Full-text  
TITLE: Fabrication and characterization of a  
PTFE-reinforced integral composite membrane for  
self-humidifying PEMFC  
AUTHOR: Huamin Zhang; Yu Zhang; Xiaobing Zhu; Liu Gang;  
Cheng Bi; Yongmin Liang (Lab of PEMFC Key Mater.  
& Technol., Chinese Acad. of Sci., Dalian,  
China)  
SOURCE: Journal of Power Sources (20 March 2007),  
vol.165, no.2, p. 786-92, 27 refs.  
CODEN: JPSODZ, ISSN: 0378-7753  
SICI: 0378-7753(20070320)165:2L:786:FCPR;1-X  
Doc.No.: S0378-7753(06)02576-6  
Published by: Elsevier, Switzerland  
DOCUMENT TYPE: Journal  
TREATMENT CODE: Practical; Experimental  
COUNTRY: Switzerland  
LANGUAGE: English  
ABSTRACT: A novel PTFE-reinforced self-humidifying membrane based on low-cost  
sulfonated poly (ether ether ketone) (SPEEK) resin was fabricated. In the membrane  
a base layer and a thin protective layer were bonded by porous  
polytetrafluoroethylene (PTFE) film. The base layer, which is composed of silicon  
oxide supported platinum catalyst (abbreviated as Pt-SiO2) dispersed in SPEEK  
resin, can suppress reactant crossover and achieve good membrane hydration due to  
the imbedded hygroscopic Pt-SiO2 catalysts. The thin protective layer, which  
constitutes of H2O2 decomposition catalyst Pt-SiO2 and high H2O2-tolerant Nafion

resin, aims to prevent the SPEEK resin degradation by H<sub>2</sub>O<sub>2</sub> produced at the cathode side by incomplete reduction of oxygen. The porous PTFE film tightly bonds with the SPEEK and the Nafion resins to form an integral membrane and accordingly to avoid delamination of the two different resins. The self-humidifying membrane was characterized by TEM, SEM and EDS, etc. The self-humidifying membrane exhibits higher open circuit voltage (OCV) of 0.98V and maximum power density value of 0.8Wcm<sup>-2</sup> than 0.94V, 0.33Wcm<sup>-2</sup> of SPEEK/PTFE membrane under dry condition, respectively. The primary 250h fuel cell durability experiment was conducted and suggested that this low-cost self-humidifying membrane was durable both on fuel cell performance and the membrane structure under fuel cell operation condition with dry H<sub>2</sub>/O<sub>2</sub>. [All rights reserved Elsevier] CLASSIFICATION CODE: A8630G Fuel cells; A8245 Electrochemistry and

electrophoresis; B8410G Fuel cells; B0560  
Polymers and plastics (engineering materials  
science)

CONTROLLED TERM: catalysts; cathodes; electrochemical electrodes;  
platinum; porous materials; proton exchange  
membrane fuel cells; resins; scanning electron  
microscopy; silicon compounds; transmission  
electron microscopy

SUPPLEMENTARY TERM: PTFE-reinforced integral composite membrane;  
self-humidifying PEMFC; polyether ether ketone;  
thin protective layer; porous  
polytetrafluoroethylene film; silicon oxide;  
platinum catalysts; reactant crossover  
suppression; Nafion resin; cathodes; integral  
membranes; self-humidifying membranes; SEM; TEM;  
0.98 V; Pt-SiO<sub>2</sub>

CHEMICAL INDEXING: Pt-SiO<sub>2</sub> int, SiO<sub>2</sub> int, O<sub>2</sub> int, Pt int, Si int, O  
int, SiO<sub>2</sub> bin, O<sub>2</sub> bin, Si bin, O bin, Pt el

PHYSICAL PROPERTIES: voltage 9.8E-01 V

ELEMENT TERMS: O\*Si; SiO<sub>2</sub>; Si cp; cp; O cp; SiO; O; Pt; Si;  
O\*Pt\*Si; O sy 3; sy 3; Pt sy 3; Si sy 3;  
Pt-SiO<sub>2</sub>; H\*O; H<sub>2</sub>O<sub>2</sub>; H cp; V; H<sub>2</sub>

L60 ANSWER 2 OF 23 INSPEC (C) 2008 IET on STN

ACCESSION NUMBER: 2006:8851274 INSPEC [Full-text](#)

TITLE: Macroporous fluoropolymeric films templated by  
silica colloidal assembly: A possible  
route to super-hydrophobic surfaces

AUTHOR: Han, Y.; Jian Li; Jun Fu; Yang Cong; Yang Wu;  
Xue, L. (Graduate Sch. of the Chinese Acad. of  
Sci., Chinese Acad. of Sci., Changchun, China)

SOURCE: Applied Surface Science (15 Jan. 2006), vol.252,  
no.6, p. 2229-34, 30 refs.  
CODEN: ASUSEE, ISSN: 0169-4332  
SICI: 0169-4332(20060115)252:6L:2229:MFFT;1-#  
Doc.No.: S0169-4332(05)00684-7  
Published by: Elsevier, Netherlands

DOCUMENT TYPE: Journal

TREATMENT CODE: Experimental

COUNTRY: Netherlands

LANGUAGE: English

ABSTRACT: A super-hydrophobic surface was obtained on a three-dimensional (3D) polyvinylidene fluoride (PVDF) macroporous film. The porous films were fabricated through self-assembled silica colloidal templates. The apparent water contact angle of the surface can be tuned from 106° to 153° through altering the sintering temperature and the diameter of the colloidal templates. A composite structure of micro-cavities and nanoholes on the PVDF surface was responsible for the super-hydrophobicity. The wettability of the porous surfaces was described by the use of

the Cassie-Baxter model and Wenzel's equation. [All rights reserved Elsevier]

CLASSIFICATION CODE: A6810C Fluid surface energy (surface tension, interface tension, angle of contact, etc.); A6855 Thin film growth, structure, and epitaxy; A6140K Structure of polymers, elastomers, and plastics; A6140G Structure of powders and porous materials; A8120E Powder techniques, compaction and sintering; A8270D Colloids

CONTROLLED TERM: colloids; contact angle; microcavities; polymer films; sintering; wetting

SUPPLEMENTARY TERM: macroporous fluoropolymeric films; self-assembled silica colloidal templates; super-hydrophobic surfaces; contact angle; sintering; composite structure; microcavities; wettability; porous surfaces; Cassie-Baxter model; Wenzel's equation

ELEMENT TERMS: D

L60 ANSWER 3 OF 23 HCAPLUS COPYRIGHT 2008 ACS on STN DUPLICATE 1

ACCESSION NUMBER: 2004:1057858 HCAPLUS Full-text

DOCUMENT NUMBER: 142:206435

ENTRY DATE: Entered STN: 10 Dec 2004

TITLE: Charge insertion into hybrid nanoarchitectures: mesoporous manganese oxide coated with ultrathin poly(phenylene oxide)

AUTHOR(S): Rhodes, Christopher P.; Long, Jeffrey W.; Doescher, Michael S.; Dening, Brett M.; Rolison, Debra R.

CORPORATE SOURCE: Surface Chemistry Branch, Naval Research Laboratory, Washington, DC, 20375, USA

SOURCE: Journal of Non-Crystalline Solids (2004), 350, 73-79

CODEN: JNCSBJ; ISSN: 0022-3093

PUBLISHER: Elsevier B.V.

DOCUMENT TYPE: Journal

LANGUAGE: English

CLASSIFICATION: 72-2 (Electrochemistry)

Section cross-reference(s): 35, 36, 52, 66, 78

#### ABSTRACT:

Hybrid inorg.-organic nanoarchitectures are created by self-limiting electrodeposition of ultrathin poly(phenylene oxide) (PPO) coatings on high surface area (>200 m<sup>2</sup> g<sup>-1</sup>), mesoporous sol-gel-derived MnO<sub>2</sub>. SEM images confirm that the polymer film coats the \*\*\*porous\*\*\* surface without completely covering over or occluding the large-scale porosity of the oxide nanoarchitecture. X-ray photoelectron spectroscopic measurements show C1s and O1s photoelectron peaks consistent with the reported PPO structure. Cyclic voltammetry demonstrates that the encapsulated MnO<sub>2</sub> undergoes reversible Li-ion insertion/deinsertion reactions where the Li<sup>+</sup> ions are supplied through the polymer coating from an MeCN electrolyte; the polymer coating does not affect the nature of insertion into the oxide. These hybrid systems assemble inorg. and organic components on the nanoscale and offer routes to new architectures with expanded functionality and enhanced electrochem. performance for energy-storage applications.

SUPPL. TERM: charge insertion hybrid nanoarchitecture mesoporous manganese oxide polyphenylene

INDEX TERM: Polyoxyphenylenes

ROLE: CPS (Chemical process); DEV (Device component use); PEP (Physical, engineering or chemical process);

PROC (Process); USES (Uses)  
 (charge insertion into hybrid nanoarchitectures and mesoporous manganese oxide coated with ultrathin poly(phenylene oxide) and lithium electrochem. inclusion and deincursion in encapsulated MnO<sub>2</sub>)

INDEX TERM: Hybrid organic-inorganic materials  
 (charge insertion into hybrid nanoarchitectures of mesoporous manganese oxide coated with ultrathin poly(phenylene oxide))

INDEX TERM: Polymerization  
 (electrochem., oxidative; of phenol on MnO<sub>2</sub> and charge insertion into hybrid nanoarchitectures and mesoporous manganese oxide coated with ultrathin poly(phenylene oxide))

INDEX TERM: Inclusion reaction  
 (electrochem., retro; of lithium by poly(phenylene oxide)-encapsulated MnO<sub>2</sub>)

INDEX TERM: Inclusion reaction  
 (electrochem.; of lithium by poly(phenylene oxide)-encapsulated MnO<sub>2</sub>)

INDEX TERM: Porous materials  
 (mesoporous; charge insertion into hybrid nanoarchitectures of mesoporous manganese oxide coated with ultrathin poly(phenylene oxide))

INDEX TERM: Polymer morphology  
 (of poly(phenylene oxide)-encapsulated MnO<sub>2</sub>)

INDEX TERM: Binding energy  
 X-ray photoelectron spectra  
 (of poly(phenylene oxide)-encapsulated MnO<sub>2</sub> on ITO)

INDEX TERM: Cyclic voltammetry  
 (of poly(phenylene oxide)-encapsulated MnO<sub>2</sub> on ITO in MeCN containing LiClO<sub>4</sub>)

INDEX TERM: 1313-13-9, Manganese oxide (MnO<sub>2</sub>), uses  
 ROLE: CPS (Chemical process); DEV (Device component use); PEP (Physical, engineering or chemical process); RCT (Reactant); PROC (Process); RACT (Reactant or reagent); USES (Uses)  
 (charge insertion into hybrid nanoarchitectures and mesoporous manganese oxide coated with ultrathin poly(phenylene oxide) and lithium electrochem. inclusion and deincursion in encapsulated MnO<sub>2</sub>)

INDEX TERM: 9041-80-9P, Poly(phenylene oxide)  
 ROLE: CPS (Chemical process); PEP (Physical, engineering or chemical process); PNU (Preparation, unclassified); PREP (Preparation); PROC (Process)  
 (charge insertion into hybrid nanoarchitectures and mesoporous manganese oxide coated with ultrathin poly(phenylene oxide) and lithium electrochem. inclusion and deincursion in poly(phenylene oxide)-encapsulated MnO<sub>2</sub>)

INDEX TERM: 7439-93-2, Lithium, reactions  
 ROLE: CPS (Chemical process); PEP (Physical, engineering or chemical process); RCT (Reactant); PROC (Process); RACT (Reactant or reagent)  
 (charge insertion into hybrid nanoarchitectures and mesoporous manganese oxide coated with ultrathin poly(phenylene oxide) and lithium electrochem. inclusion and deincursion in poly(phenylene oxide)-encapsulated MnO<sub>2</sub>)

INDEX TERM: 50926-11-9, ITO

ROLE: DEV (Device component use); USES (Uses)  
(charge insertion into hybrid nanoarchitectures and mesoporous manganese oxide coated with ultrathin poly(phenylene oxide) and lithium electrochem. inclusion and deinclusion in poly(phenylene oxide)-encapsulated MnO<sub>2</sub> on electrode of)

INDEX TERM: 7791-03-9, Lithium perchlorate (LiClO<sub>4</sub>)

ROLE: NUU (Other use, unclassified); PRP (Properties); USES (Uses)  
(cyclic voltammetry of poly(phenylene oxide)-encapsulated MnO<sub>2</sub> on ITO in MeCN containing LiClO<sub>4</sub>)

INDEX TERM: 108-95-2, Phenol, reactions

ROLE: RCT (Reactant); RACT (Reactant or reagent)  
(electrochem. oxidative polymerization on MnO<sub>2</sub> and charge insertion into hybrid nanoarchitectures and mesoporous manganese oxide coated with ultrathin poly(phenylene oxide))

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L60 ANSWER 4 OF 23 INSPEC (C) 2008 IET on STN

ACCESSION NUMBER: 2005:8351862 INSPEC Full-text

DOCUMENT NUMBER: A2005-10-6855-058

TITLE: A novel synthetic process of  
polyimide/poly(methyl silsesquioxane) hybrid  
materials with nano/micro pore structures

AUTHOR: Kyung-II Kim; Joon-Hyun An; Jun-Young Lee;  
Jung-Hyun Kim (Dept. of Chem. Eng., Yonsei  
Univ., Seoul, South Korea)

SOURCE: Molecular Crystals and Liquid Crystals (2004),  
vol.424, p. 25-34, 20 refs.  
CODEN: MCLCE9, ISSN: 1058-725X  
SICI: 1058-725X(2004)424L:25:NSPP;1-8  
Published by: Gordon & Breach, Switzerland  
Conference: 14th Korea-Japan Joint Forum on  
Organic Materials for Electronics and Photonics  
KJF 2003, Busan, South Korea, 28 Sept.-1 Oct.  
2003

DOCUMENT TYPE: Conference; Conference Article; Journal

TREATMENT CODE: Experimental

COUNTRY: Switzerland

LANGUAGE: English

ABSTRACT: A novel synthetic process for multi-porous polyimide (PI)/poly (methyl silsesquioxane) (PMSSQ) hybrid material has been studied via supercritical CO2 technology. The end groups of PI precursors were modified by coupling agent to be hybridized with alkoxysilanes and became PMSSQ precursors. PI/PMSSQ hybrid precursor solution was spun on a silicon wafer substrate for film formation. The PI precursor segment was imidized and micro-pores were developed by removal of by-product, CO2 via supercritical CO2 media. The PMSSQ precursor segment was cured and nano-pores were generated by supercritical extraction. Average micro-pore size and nano-pore size were 10  $\mu\text{m}$  and 40 nm respectively. The dielectric constant of the multi-porous PI /PMSSQ hybrid film was calculated to 2.5

CLASSIFICATION CODE: A6855 Thin film growth, structure, and epitaxy;  
A8116 Methods of nanofabrication and processing;  
A6140K Structure of polymers, elastomers, and  
plastics; A7720 Dielectric permittivity; A6820  
Solid surface structure; A6140G Structure of  
powders and porous materials

CONTROLLED TERM: curing; nanoporous materials; nanotechnology;  
organic-inorganic hybrid

SUPPLEMENTARY TERM: materials; permittivity; polymer films

SUPPLEMENTARY TERM: multiporous polyimide-poly(methyl  
silsesquioxane) hybrid materials; nanostructure;

micropore structure; hybridization;  
alkoxysilanes; PI-PMSSQ hybrid precursor  
solution; silicon wafer substrate; dielectric  
constant; hybrid film; curing; supercritical CO2  
technology; 10 micron; 40 nm; Si

CHEMICAL INDEXING: Si sur, Si el  
PHYSICAL PROPERTIES: size 1.0E-05 m; size 4.0E-08 m  
ELEMENT TERMS: C\*O; CO2; C cp; cp; O cp; Si

L60 ANSWER 5 OF 23 HCAPLUS COPYRIGHT 2008 ACS on STN

ACCESSION NUMBER: 2003:471041 HCAPLUS Full-text

DOCUMENT NUMBER: 139:24138

ENTRY DATE: Entered STN: 20 Jun 2003

TITLE: Secondary nonaqueous electrolyte  
battery

INVENTOR(S): Saito, Satoshi

PATENT ASSIGNEE(S): Japan Storage Battery Co., Ltd., Japan

SOURCE: Jpn. Kokai Tokkyo Koho, 8 pp.

CODEN: JKXXAF

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

INT. PATENT CLASSIF.:

MAIN: H01M004-02

SECONDARY: H01M002-16; H01M010-40

CLASSIFICATION: 52-2 (Electrochemical, Radiational, and Thermal  
Energy Technology)

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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JP 2003173769	A	20030620	JP 2001-371510	200112 05
				200112 05

PRIORITY APPLN. INFO.: JP 2001-371510

#### PATENT CLASSIFICATION CODES:

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
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JP 2003173769	ICM	H01M004-02
	ICS	H01M002-16; H01M010-40
	IPCI	H01M0004-02 [ICM,7]; H01M0002-16 [ICS,7]; H01M0010-40 [ICS,7]; H01M0010-36 [ICS,7,C*]
	IPCR	H01M0002-16 [I,C*]; H01M0002-16 [I,A]; H01M0004-02 [I,C*]; H01M0004-02 [I,A]; H01M0010-36 [I,C*]; H01M0010-40 [I,A]

#### ABSTRACT:

The battery has a nonaq. electrolyte between an active mass  
containing anode mixture layer and an active mass containing cathode mixture layer;  
where the electrolyte is made of an electrolyte solution  
contained porous polymer film; and the  
anode mixture layer and/or the cathode mixture layer contains an inorg. solid  
\*\*\*electrolyte\*\*\* powder.

SUPPL. TERM: secondary battery nonaq electrolyte  
porous polymer film; inorg  
solid electrolyte powder electrode secondary

battery  
INDEX TERM: Battery electrodes  
(electrodes containing inorg. solid electrolyte  
powders for secondary lithium batteries)  
INDEX TERM: Secondary batteries  
(electrolytes and electrodes containing  
porous polymers and inorg. solid  
electrolytes resp. for secondary lithium  
batteries)  
INDEX TERM: Battery electrolytes  
(nonaq. electrolytes containing  
porous polymer films  
for secondary lithium batteries)  
INDEX TERM: 7782-42-5, Graphite, uses  
ROLE: DEV (Device component use); USES (Uses)  
(anode; electrodes containing inorg. solid  
electrolyte powders for secondary lithium  
batteries)  
INDEX TERM: 12190-79-3, Cobalt lithium oxide (CoLiO<sub>2</sub>)  
ROLE: DEV (Device component use); USES (Uses)  
(cathode; electrodes containing inorg. solid  
electrolyte powders for secondary lithium  
batteries)  
INDEX TERM: 7631-86-9, Silica, uses 12057-24-8,  
Lithium oxide, uses  
ROLE: DEV (Device component use); USES (Uses)  
(electrodes containing inorg. solid electrolyte  
powders for secondary lithium batteries)  
INDEX TERM: 9011-17-0, Hexafluoropropylene-vinylidene fluoride  
copolymer  
ROLE: DEV (Device component use); USES (Uses)  
(electrolyte; nonaq. electrolytes  
containing porous polymer  
films for secondary lithium batteries)  
INDEX TERM: 96-49-1, Ethylene carbonate 105-58-8,  
Diethyl carbonate 21324-40-3,  
Lithium hexafluorophosphate  
ROLE: DEV (Device component use); USES (Uses)  
(nonaq. electrolytes containing  
porous polymer films  
for secondary lithium batteries)

L60 ANSWER 6 OF 23 HCAPLUS COPYRIGHT 2008 ACS on STN DUPLICATE 2  
ACCESSION NUMBER: 2002:635135 HCAPLUS Full-text  
DOCUMENT NUMBER: 138:58808  
ENTRY DATE: Entered STN: 22 Aug 2002  
TITLE: Effect of inorganics on polymer  
electrolytes for lithium batteries  
AUTHOR(S): Bai, Ying; Wu, Feng; Ren, Xu-mei  
CORPORATE SOURCE: School of Chemical Engineering and Materials  
Science, Beijing Institute of Technology,  
National Development Center for Hi-Tech Green  
Materials, Beijing, 100081, Peop. Rep. China  
SOURCE: Dianchi (2002), 32(Suppl.), 56-57  
CODEN: DNCHEP; ISSN: 1001-1579  
PUBLISHER: Dianchi Zazhishe  
DOCUMENT TYPE: Journal  
LANGUAGE: Chinese  
CLASSIFICATION: 52-2 (Electrochemical, Radiational, and Thermal  
Energy Technology)

## Section cross-reference(s): 38

## ABSTRACT:

On the basis of the preparation of the PVDF-HFP porous  
\*\*\*films\*\*\* by a phase-inversion method, the composite polymer  
\*\*\*electrolyte\*\*\* membranes with SiO<sub>2</sub> or zeolite  
additive were prepared, which could be used in the secondary lithium  
batteries. The film morphologies and the charge-discharge  
features were characterized with SEM and electrochem. test, resp. The  
anal. of the n-BuOH uptakes showed that the composite polymer  
\*\*\*films\*\*\* had higher porosities and could meet the demands  
of the lithium secondary batteries.

SUPPL. TERM: lithium battery polymer electrolyte  
inorg additive effect  
INDEX TERM: Battery electrolytes  
Polymer electrolytes  
(effect of inorgs. on polymer electrolytes  
for lithium batteries)  
INDEX TERM: Zeolites (synthetic), uses  
ROLE: MOA (Modifier or additive use); USES (Uses)  
(effect of inorgs. on polymer electrolytes  
for lithium batteries)  
INDEX TERM: Phase  
(inversion; effect of inorgs. on polymer  
electrolytes for lithium batteries)  
INDEX TERM: Secondary batteries  
(lithium; effect of inorgs. on polymer  
electrolytes for lithium batteries)  
INDEX TERM: 9011-17-0, Hexafluoropropylene-vinylidene fluoride  
copolymer  
ROLE: DEV (Device component use); USES (Uses)  
(effect of inorgs. on polymer electrolytes  
for lithium batteries)  
INDEX TERM: 7631-86-9, Silica, uses  
ROLE: MOA (Modifier or additive use); USES (Uses)  
(effect of inorgs. on polymer electrolytes  
for lithium batteries)

L60 ANSWER 7 OF 23 COMPENDEX COPYRIGHT 2008 EEI on STN

ACCESSION NUMBER: 2001(54):865 COMPENDEX Full-text

TITLE: 2001 Annual report conference on electrical  
insulation and dielectric phenomena.

MEETING TITLE: 2001 Annual Report Conference on Electrical  
Insulation and Dielectric Phenomena.

MEETING LOCATION: Kitchener, ON, Canada

MEETING DATE: 14 Oct 2001-17 Oct 2001

SOURCE: Conference on Electrical Insulation and  
Dielectric Phenomena (CEIDP), Annual Report  
2001., (IEEE cat n 01CH37225) 693p

SOURCE: Conference on Electrical Insulation and  
Dielectric Phenomena (CEIDP), Annual Report  
2001., (IEEE cat n 01CH37225) 693p  
CODEN: CEIPAZ ISSN: 0084-9162

PUBLICATION YEAR: 2001

MEETING NUMBER: 58825

DOCUMENT TYPE: Conference Proceedings

TREATMENT CODE: Theoretical; Experimental

LANGUAGE: English

ABSTRACT: The proceedings contains 171 papers of the 2001 Annual Report  
Conference on Electrical Insulation and Dielectric Phenomena. The topics include:

charging of cellular space charge electret films in various gas atmospheres; space charge profiles in planar LDPE with TiO<sub>2</sub> additives and a temperature gradient; influence of the electrode materials on performance of plasma opening switch; coating of porous polytetrafluoroethylene films with other polymers for electret applications; measurement of nonlinear dielectric properties-effect of dielectric dispersion; propagation modes of surface discharge plasma in a metallized polymer film capacitor; and influence of morphology and thermal stability on tree initiation in polyethylene films. (Edited abstract) CLASSIFICATION CODE: 701.1 Electricity: Basic Concepts and Phenomena;

708.1 Dielectric Materials; 815.1 Polymeric Materials; 817.1 Plastics Products; 712.1 Semiconducting Materials; 751.2 Acoustic Properties of Materials

CONTROLLED TERM: \*Electric space charge; Electric breakdown; Electric discharges; Electrets; Electric potential; Polymer blends; Semiconductor doping; Electrodes; Polymers; Electric conductance; Electric insulation; Dielectric materials; Electric field effects

SUPPLEMENTARY TERM: Dielectric breakdown; Corona discharges; Pyroelectric coefficients; Charge separation; Schottky coefficients; Plasma opening switches; Temperature gradients; Impedance spectroscopy; Thermal plasma processing; EiRev

ELEMENT TERM: O\*Ti; TiO; Ti cp; cp; O cp

L60 ANSWER 8 OF 23 HCAPLUS COPYRIGHT 2008 ACS on STN

ACCESSION NUMBER: 2001:868873 HCAPLUS Full-text

DOCUMENT NUMBER: 136:9101

ENTRY DATE: Entered STN: 30 Nov 2001

TITLE: Fabrication method for lithium secondary battery with polymer electrolyte prepared by spray method

INVENTOR(S): Yun, Kyung Suk; Cho, Byung Won; Cho, Won Il; Kim, Hyung Sun; Kim, Un Seok

PATENT ASSIGNEE(S): Korea Institute of Science and Technology, S. Korea

SOURCE: PCT Int. Appl., 34 pp.  
CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: English

INT. PATENT CLASSIF.:

MAIN: H01M010-38

CLASSIFICATION: 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 38

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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WO 2001091222	A1	20011129	WO 2000-KR515	20000522

W: JP, KR, US

PRIORITY APPLN. INFO.: WO 2000-KR515

20000522

## PATENT CLASSIFICATION CODES:

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
WO 2001091222	ICM	H01M010-38
	IPCI	H01M0010-38 [ICM, 7]; H01M0010-36 [ICM, 7, C*]
	IPCR	H01M0002-16 [I, C*]; H01M0002-16 [I, A]; H01M0010-36 [I, C*]; H01M0010-38 [I, A]; H01M0010-40 [I, A]
	ECLA	H01M002/16C3; H01M010/38; H01M010/40B; T01M

## ABSTRACT:

The present invention provides a lithium secondary battery and its fabrication method. More particularly, the present invention provides a lithium secondary battery comprising a porous polymer electrolyte and its fabrication method, wherein the polymer electrolyte is fabricated by the following process: (a) dissolving at least one polymer with plasticizers and organic electrolyte solvents to obtain at least one polymeric electrolyte solution; (b) adding the obtained polymeric electrolyte solution to a barrel of a spray machine, and (c) spraying the polymeric electrolyte solution onto a substrate using a nozzle to form a porous polymer \*\*\*electrolyte\*\*\* film. The lithium secondary battery of the present invention has advantages of better adhesion with electrodes, good mech. strength, better performance at low and high temps., and better compatibility with organic electrolytes of a lithium secondary battery.

SUPPL. TERM: polymer electrolyte lithium secondary battery; spray method fabrication polymer electrolyte lithium secondary battery

INDEX TERM: Inductance  
(electrostatic, spray method; fabrication method for lithium secondary battery with polymer electrolyte prepared by spray method)

INDEX TERM: Battery electrolytes  
Lamination  
Plasticizers  
Polymer electrolytes  
(fabrication method for lithium secondary battery with polymer electrolyte prepared by spray method)

INDEX TERM: Fluoropolymers, uses  
Polyoxyalkylenes, uses  
ROLE: DEV (Device component use); USES (Uses)  
(fabrication method for lithium secondary battery with polymer electrolyte prepared by spray method)

INDEX TERM: Fluoropolymers, uses  
ROLE: MOA (Modifier or additive use); USES (Uses)  
(filling agent; fabrication method for lithium secondary battery with polymer electrolyte prepared by spray method)

INDEX TERM: Secondary batteries  
(lithium; fabrication method for lithium secondary battery with polymer electrolyte prepared by spray method)

INDEX TERM: Alcohols, uses  
ROLE: MOA (Modifier or additive use); USES (Uses)  
(plasticizer; fabrication method for lithium secondary battery with polymer electrolyte prepared by spray method)

INDEX TERM: Coating process  
(spray; fabrication method for lithium secondary battery with polymer electrolyte prepared by spray method)

INDEX TERM: 79-20-9, Methyl acetate 105-37-3, Ethyl propionate 109-99-9, Thf, uses 141-78-6, Ethyl acetate, uses 554-12-1, Methyl propionate 7782-42-5, Graphite, uses 7791-03-9, Lithium perchlorate 9002-86-2, Pvc 9002-88-4, Polyethylene 9003-07-0, Polypropylene 9003-20-7, Polyvinyl acetate 9004-34-6, Cellulose, uses 9004-35-7, Cellulose acetate 9004-36-8 9004-39-1, Cellulose acetate propionate 9010-76-8, Acrylonitrile-vinylidene chloride copolymer 9010-88-2, Ethyl acrylate-methylmethacrylate copolymer 9011-14-7, Pmma 9011-17-0, Hexafluoropropylene-vinylidene fluoride copolymer 12190-79-3, Cobalt lithium oxide colio2 14283-07-9, Lithium tetrafluoroborate 21324-40-3, Lithium hexafluorophosphate 24937-79-9, PvdF 24968-79-4, Acrylonitrile-methyl acrylate copolymer 24980-34-5, Polyethylenesulfide 25014-41-9, Polyacrylonitrile 25086-89-9, Vinyl acetate-vinyl pyrrolidone copolymer 25322-68-3, Peo 25322-69-4, Polypropylene oxide 25667-11-2, Polyethylenesuccinate 26913-06-4, Poly[imino(1,2-ethanediyl)] 28726-47-8, Poly(oxyethylene-oxyethylene) 29935-35-1, Lithium hexafluoroarsenate 33454-82-9, Lithium triflate 98973-15-0, Poly[bis(2-(2-methoxyethoxyethoxy))-phosphazene]  
ROLE: DEV (Device component use); USES (Uses)  
(fabrication method for lithium secondary battery with polymer electrolyte prepared by spray method)

INDEX TERM: 554-13-2, Lithium carbonate 1304-28-5, Barium oxide bao, uses 1309-48-4, Magnesia, uses 1310-65-2, Lithium hydroxide 1313-59-3, Sodium oxide, uses 1344-28-1, Alumina, uses 7631-86-9, Silica, uses 7789-24-4, Lithium fluoride, uses 9002-84-0, PtfE 12003-67-7, Aluminum lithium oxide allio2 12047-27-7, Barium titanium oxide batio3, uses 12057-24-8, Lithia, uses 13463-67-7, Titania, uses 26134-62-3, Lithium nitride  
ROLE: MOA (Modifier or additive use); USES (Uses)  
(filling agent; fabrication method for lithium secondary battery with polymer electrolyte prepared by spray method)

INDEX TERM: 67-64-1, Acetone, uses 67-68-5, DmsO, uses 68-12-2, Dmf, uses 80-73-9, 1,3-Dimethyl-2-imidazolidinone 96-48-0, Butyrolactone 96-49-1, Ethylene carbonate 105-58-8, Diethyl carbonate 108-32-7, Propylene carbonate 110-71-4, 1,2-Dimethoxyethane 127-19-5, n,n-Dimethyl acetamide 143-24-8, Tetraethylene glycol dimethyl ether 616-38-6, Dimethyl carbonate 623-53-0, Ethyl methyl carbonate 872-50-4, n-Methyl-2-pyrrolidone, uses 4437-85-8, Butylene carbonate 26101-52-0

ROLE: MOA (Modifier or additive use); USES (Uses)  
(plasticizer; fabrication method for lithium  
secondary battery with polymer electrolyte  
prepared by spray method)

REFERENCE COUNT: 10 THERE ARE 10 CITED REFERENCES AVAILABLE FOR THIS  
RECORD.

REFERENCE(S): (1) Asahi Chem Ind Co Ltd; JP A03038226 1991  
(2) Celanese Corporation; US A3925525 1975  
(3) Fuji Photo Film Co Ltd; JP B108250100 1996  
(4) Matsushita Electric Ind Co Ltd; US A5525443 1996  
(5) Mitsubishi Rayon Co Ltd; JP A60252716 1985  
(6) Nec Corp; JP A12082498 2000  
(7) Tokyo Shibaura Electric Co Toshiba Battery; EP  
A20398689 1990  
(8) Toshiba Battery Co Ltd; JP A09022724 1997  
(9) Toshiba Battery Co Ltd; JP A10208775 1998  
(10) Us Army; US A4812375 1989

L60 ANSWER 9 OF 23 HCAPLUS COPYRIGHT 2008 ACS on STN

ACCESSION NUMBER: 2001:868870 HCAPLUS Full-text

DOCUMENT NUMBER: 136:9098

ENTRY DATE: Entered STN: 30 Nov 2001

TITLE: A lithium secondary battery comprising a  
porous polymer separator  
film fabricated by a spray method

INVENTOR(S): Yun, Kyung Suk; Cho, Byung Won; Cho, Won Il;  
Kim, Hyung Sun; Kim, Un Seok

PATENT ASSIGNEE(S): Korea Institute of Science and Technology, S.  
Korea

SOURCE: PCT Int. Appl., 36 pp.  
CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: English

INT. PATENT CLASSIF.:

MAIN: H01M010-38

CLASSIFICATION: 52-2 (Electrochemical, Radiational, and Thermal  
Energy Technology)

Section cross-reference(s): 38

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
-----	----	-----	-----	
WO 2001091219	A1	20011129	WO 2000-KR512	200005 22

W: JP, KR, US

PRIORITY APPLN. INFO.:	WO 2000-KR512	200005 22
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PATENT CLASSIFICATION CODES:

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
-----	-----	-----
WO 2001091219	ICM	H01M010-38
	IPCI	H01M0010-38 [ICM,7]; H01M0010-36 [ICM,7,C*]
	IPCR	H01M0002-16 [I,C*]; H01M0002-16 [I,A]; H01M0010-04 [I,C*]; H01M0010-04 [I,A]; H01M0010-36 [I,C*]; H01M0010-38 [I,A];

H01M0010-40 [I,A]  
ECLA H01M002/16E; H01M010/04D; H01M010/40B; T01M;  
T01M; T01M

## ABSTRACT:

The present invention provides a lithium secondary battery and its fabrication method. More particularly, the present invention provides a lithium secondary battery comprising a porous polymer separator film and its fabrication method, wherein the \*\*\*porous\*\*\* polymer separator film is fabricated by the following process : (a) melting at least one polymer or dissolving at least one polymer with an organic solvent to obtain at least one polymeric melt or at least one polymeric solution; (b) adding the obtained polymeric melt or polymeric solution to barrels of a spray machine; and (c) spraying the polymeric melt or polymeric solution onto a substrate using a nozzle to form a porous separator film. The lithium secondary battery of the present invention has advantages of better adhesion with electrodes, good mech. strength, better performance at low and high temps., and better compatibility with an organic electrolyte solution of a lithium secondary battery.

SUPPL. TERM: lithium secondary battery porous polymer separator  
INDEX TERM: Inductance  
(electrostatic induction; lithium secondary battery comprising porous polymer separator film fabricated by spray method)  
INDEX TERM: Fluoropolymers, uses  
ROLE: MOA (Modifier or additive use); USES (Uses)  
(filling agent; lithium secondary battery comprising porous polymer separator film fabricated by spray method)  
INDEX TERM: Secondary battery separators  
(lithium secondary battery comprising porous polymer separator film fabricated by spray method)  
INDEX TERM: Alcohols, uses  
Fluoropolymers, uses  
Polyoxyalkylenes, uses  
ROLE: DEV (Device component use); USES (Uses)  
(lithium secondary battery comprising porous polymer separator film fabricated by spray method)  
INDEX TERM: Secondary batteries  
(lithium; lithium secondary battery comprising porous polymer separator film fabricated by spray method)  
INDEX TERM: Coating process  
(spray; lithium secondary battery comprising porous polymer separator film fabricated by spray method)  
INDEX TERM: 554-13-2, Lithium carbonate 1304-28-5, Baria, uses  
1309-48-4, Magnesia, uses 1310-65-2, Lithium hydroxide 1313-59-3, Sodium oxide na2o, uses  
1344-28-1, Alumina, uses 7631-86-9, Silica, uses 7789-24-4, Lithium fluoride, uses 9002-84-0, Ptfе 12003-67-7, Aluminum lithium oxide allio2 12047-27-7, Barium titanium oxide batio3, uses 12057-24-8, Lithia, uses 13463-67-7, Titania, uses 26134-62-3, Lithium

nitride

ROLE: MOA (Modifier or additive use); USES (Uses)  
 (filling agent; lithium secondary battery  
 comprising porous polymer  
 separator film fabricated by spray  
 method)

INDEX TERM:

67-64-1, Acetone, uses 67-68-5, DmsO, uses  
 68-12-2, Dmf, uses 79-20-9, Methyl acetate  
 80-73-9, 1,3-Dimethyl-2-imidazolidinone 96-48-0,  
 Butyrolactone 96-49-1, Ethylene carbonate  
 105-37-3, Ethyl propionate 105-58-8, Diethyl  
 carbonate 108-32-7, Propylene  
 carbonate 109-99-9, Thf, uses  
 110-71-4, 1,2-Dimethoxyethane 127-19-5,  
 n,n-Dimethylacetamide 141-78-6, Ethyl acetate, uses  
 143-24-8, Tetraethylene glycol dimethyl ether  
 554-12-1, Methyl propionate 616-38-6,  
 Dimethyl carbonate 623-53-0, Ethyl  
 methyl carbonate 872-50-4, n-Methyl-2-pyrrolidone,  
 uses 4437-85-8, Butylene carbonate 7782-42-5,  
 Graphite, uses 7791-03-9, Lithium perchlorate  
 9002-86-2, Pvc 9002-88-4, Polyethylene 9003-07-0,  
 Polypropylene 9003-20-7, Polyvinyl acetate  
 9004-34-6, Cellulose, uses 9004-35-7, Cellulose  
 acetate 9004-36-8 9004-39-1, Cellulose acetate  
 propionate 9010-76-8, Acrylonitrile-vinylidene  
 chloride copolymer 9010-88-2, Ethyl acrylate-methyl  
 methacrylate copolymer 9011-14-7, Pmma 9011-17-0,  
 Hexafluoropropylene-vinylidene fluoride copolymer  
 12190-79-3, Cobalt lithium oxide colio2 14283-07-9,  
 Lithium tetrafluoroborate 21324-40-3, Lithium  
 hexafluorophosphate 24937-79-9, PvdF 24968-79-4,  
 Acrylonitrile-methylacrylate copolymer 24980-34-5,  
 Polyethylene sulfide 25014-41-9, Polyacrylonitrile  
 25086-89-9, Vinyl acetate-vinylpyrrolidone copolymer  
 25322-68-3, Peo 25322-69-4, Polypropylene oxide  
 25667-11-2, Polyethylene succinate 26101-52-0  
 26913-06-4, Poly[imino(1,2-ethanediyl)] 28726-47-8,  
 Poly(Oxymethyleneoxyethylene) 29935-35-1, Lithium  
 hexafluoroarsenate 33454-82-9, Lithium triflate  
 98973-15-0, Poly[bis(2-(2-  
 methoxyethoxyethoxy))phosphazene]

ROLE: DEV (Device component use); USES (Uses)  
 (lithium secondary battery comprising  
 porous polymer separator  
 film fabricated by spray method)

REFERENCE COUNT: 12 THERE ARE 12 CITED REFERENCES AVAILABLE FOR THIS  
 RECORD.

REFERENCE(S):

- (1) Asahi Chem Ind Co Ltd; JP A03038226 1991
- (2) Celanese Corporation; US A3925525 1975
- (3) Fuji Photo Film Co Ltd; JP B108250100 1996
- (4) Matsushita Electric Ind Co Ltd; US A5525443 1996
- (5) Mitsubishi Rayon Co Ltd; JP A60252716 1985
- (6) Nec Corp; JP A12082498 2000
- (7) Polymer Processing Research Inst Ltd; US A6051175  
 2000
- (8) The Dow Jones Chemical Company; US A5296185 1994
- (9) Tokyo Shibaura Electric Co Toshiba Battery; EP  
 A20398689 1990
- (10) Toshiba Battery Co Ltd; JP A09022724 1997

- (11) Toshiba Battery Co Ltd; JP A10208775 1998  
 (12) Us Army; US A4812375 1989

L60 ANSWER 10 OF 23 HCAPLUS COPYRIGHT 2008 ACS on STN  
 ACCESSION NUMBER: 2001:851556 HCAPLUS Full-text  
 DOCUMENT NUMBER: 135:374195  
 ENTRY DATE: Entered STN: 23 Nov 2001  
 TITLE: Fabrication of a lithium secondary battery  
 comprising a superfine fibrous polymer separator  
 film  
 INVENTOR(S): Yun, Kyung Suk; Cho, Byung Won; Jo, Seong Mu;  
 Lee, Wha Seop; Cho, Won Il; Park, Kun You; Kim,  
 Hyung Sun; Kim, Un Seok; Ko, Seok Ku; Chun, Suk  
 Won; Choi, Sung Won  
 PATENT ASSIGNEE(S): Korea Institute of Science and Technology, S.  
 Korea  
 SOURCE: PCT Int. Appl., 34 pp.  
 CODEN: PIXXD2  
 DOCUMENT TYPE: Patent  
 LANGUAGE: English  
 INT. PATENT CLASSIF.:  
 MAIN: H01M010-40  
 CLASSIFICATION: 52-2 (Electrochemical, Radiational, and Thermal  
 Energy Technology)  
 Section cross-reference(s): 38  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO. -----	KIND ----	DATE -----	APPLICATION NO. -----	DATE
WO 2001089022	A1	20011122	WO 2000-KR500	200005 19
W: JP, KR, US JP 2003533862	T	20031111	JP 2001-585344	200005 19
US 7279251	B1	20071009	US 2003-276880	200307 11
PRIORITY APPLN. INFO.:			WO 2000-KR500	W 200005 19

## PATENT CLASSIFICATION CODES:

PATENT NO. -----	CLASS -----	PATENT FAMILY CLASSIFICATION CODES -----
WO 2001089022	ICM	H01M010-40
	IPCI	H01M0010-40 [ICM, 7]; H01M0010-36 [ICM, 7, C*]
	IPCR	H01M0002-14 [N, C*]; H01M0002-14 [N, A]; H01M0002-16 [I, C*]; H01M0002-16 [I, A]; H01M0010-04 [I, C*]; H01M0010-04 [I, A]; H01M0010-36 [I, C*]; H01M0010-40 [I, A]
	ECLA	H01M002/16B3; H01M002/16E; H01M010/04D; H01M010/04F; H01M010/40B; H01M010/40L2; T01M; T01M
JP 2003533862	IPCI	H01M0002-16 [ICM, 7]; H01M0010-40 [ICS, 7]; H01M0010-36 [ICS, 7, C*]
	IPCR	H01M0002-14 [N, C*]; H01M0002-14 [N, A];

US 7279251 IPCI H01M0002-16 [I,C\*]; H01M0002-16 [I,A];  
NCL H01M0010-04 [I,C\*]; H01M0010-04 [I,A];  
H01M0010-36 [I,C\*]; H01M0010-40 [I,A]  
429/247.000; 429/129.000; 429/248.000;  
429/249.000

## ABSTRACT:

The present invention provides a lithium secondary battery and its fabrication method. More particularly, the present invention provides a lithium secondary battery comprising a super fine fibrous porous \*\*\*polymer\*\*\* separator film and its fabrication method, wherein the porous polymer separator film is fabricated by the following process: (a) melting at least one polymer or dissolving at least one polymer with organic solvents to obtain at least one polymeric melt or at least one polymeric solution; (b) adding the obtained polymeric melt or polymeric solution to barrels of an electrospinning machine; and (c) discharging the polymeric melt or polymeric solution onto a substrate using a nozzle to form a porous separator film. The lithium secondary battery of the present invention has the advantages of better adhesion with electrodes, good mech. strength, better performance at low and high temps., and better compatibility with organic electrolyte solution of a lithium secondary battery.

SUPPL. TERM: lithium secondary battery superfine fibrous polymer separator

INDEX TERM: Secondary battery separators  
(fabrication of lithium secondary battery comprising superfine fibrous polymer separator film)

INDEX TERM: Alcohols, uses  
Polyoxyalkylenes, uses  
ROLE: DEV (Device component use); USES (Uses)  
(fabrication of lithium secondary battery comprising superfine fibrous polymer separator film)

INDEX TERM: Fluoropolymers, uses  
ROLE: MOA (Modifier or additive use); USES (Uses)  
(fabrication of lithium secondary battery comprising superfine fibrous polymer separator film)

INDEX TERM: Secondary batteries  
(lithium; fabrication of lithium secondary battery comprising superfine fibrous polymer separator film)

INDEX TERM: Fibers  
ROLE: DEV (Device component use); USES (Uses)  
(spinning, electro-; fabrication of lithium secondary battery comprising superfine fibrous polymer separator film)

INDEX TERM: 67-64-1, Acetone, uses 67-68-5, Dmso, uses  
68-12-2, Dmf, uses 79-20-9, Methyl acetate  
80-73-9, 1,3-Dimethyl-2-imidazolidinone 96-48-0, Butyrolactone 96-49-1, Ethylene carbonate  
105-37-3, Ethyl propionate 105-58-8, Diethyl carbonate 108-32-7, Propylene carbonate 109-99-9, Thf, uses  
110-71-4, 1,2-Dimethoxyethane 127-19-5, Dimethyl acetamide 141-78-6, Ethyl acetate, uses  
143-24-8, Tetraethyleneglycol dimethyl ether

554-12-1, Methyl propionate 616-38-6,  
Dimethyl carbonate 623-53-0,  
Ethylmethyl carbonate 872-50-4, n-Methyl-2-  
pyrrolidone, uses 4437-85-8, Butylene carbonate  
7782-42-5, Graphite, uses 7791-03-9, Lithium  
perchlorate 9002-86-2, Pvc 9002-88-4, Polyethylene  
9003-07-0, Polypropylene 9003-20-7, Polyvinyl  
acetate 9004-34-6, Cellulose, uses 9004-35-7,  
Cellulose acetate 9004-36-8 9004-39-1, Cellulose  
acetate propionate 9010-76-8, Acrylonitrile-  
vinylidene chloride copolymer 9010-88-2, Ethyl  
acrylate-methyl methacrylate copolymer 9011-14-7,  
Pmma 9011-17-0, Hexafluoropropylene-vinylidene  
fluoride copolymer 12190-79-3, Cobalt lithium oxide  
colio2 14283-07-9, Lithium tetrafluoroborate  
21324-40-3, Lithium hexafluorophosphate 24936-67-2,  
Polyethylenesulfide 24937-79-9, PvdF 25014-41-9,  
Polyacrylonitrile 25086-89-9, Vinyl acetate-vinyl  
pyrrolidone copolymer 25266-14-2 25322-68-3, Peo  
25322-69-4, Polypropylene oxide 25569-53-3,  
Polyethylenesuccinate 25749-57-9,  
Acrylonitrile-methacrylic acid copolymer 26101-52-0  
26913-06-4, Poly[imino(1,2-ethanediyl)] 29935-35-1,  
Lithium hexafluoroarsenate 33454-82-9, Lithium  
triflate 98973-15-0

ROLE: DEV (Device component use); USES (Uses)  
(fabrication of lithium secondary battery  
comprising superfine fibrous polymer separator  
film)

INDEX TERM: 554-13-2, Lithium carbonate 1344-28-1,  
Alumina, uses 9002-84-0, PtfE

ROLE: MOA (Modifier or additive use); USES (Uses)  
(fabrication of lithium secondary battery  
comprising superfine fibrous polymer separator  
film)

INDEX TERM: 1304-28-5, Barium monoxide, uses 1309-48-4,  
Magnesia, uses 1310-65-2, Lithium hydroxide  
1313-59-3, Sodium oxide na2o, uses 7631-86-9,  
Silica, uses 7789-24-4, Lithium fluoride,  
uses 12003-67-7, Aluminum lithium oxide allio2  
12047-27-7, Barium titanium oxide

batio3, uses 12057-24-8, Lithia, uses 13463-67-7,  
Titania, uses 26134-62-3, Lithium nitride

ROLE: MOA (Modifier or additive use); USES (Uses)  
(filling agent; fabrication of lithium secondary  
battery comprising superfine fibrous polymer  
separator film)

REFERENCE COUNT: 8 THERE ARE 8 CITED REFERENCES AVAILABLE FOR THIS  
RECORD.

REFERENCE(S): (1) Celanese Corporation; US 3925525 A 1975 HCAPLUS  
(2) Fuji Photo Film Co Ltd; JP 08250100 B1 1996  
(3) Matsushita Electric Ind Co Ltd; US 5525443 A 1996  
HCAPLUS  
(4) Mitsubishi Rayon Co Ltd; JP 60252716 A 1985  
HCAPLUS  
(5) NEC Corp; JP 12082498 A 2000  
(6) Polymer Processing Research Inst Ltd; US 6051175 A  
2000  
(7) The Dow Jones Chemical Company; US 5296185 A 1994  
HCAPLUS

(8) Toshiba Battery Co Ltd; JP 09022724 A 1997 HCAPLUS

L60 ANSWER 11 OF 23 HCAPLUS COPYRIGHT 2008 ACS on STN  
 ACCESSION NUMBER: 2004:877585 HCAPLUS Full-text  
 DOCUMENT NUMBER: 142:77499  
 ENTRY DATE: Entered STN: 22 Oct 2004  
 TITLE: Fabrication of porous polymer electrolyte for secondary batteries  
 INVENTOR(S): Lee, Yeong Gi; Park, Jeong Gi  
 PATENT ASSIGNEE(S): Korea Advanced Institute of Science and Technology, S. Korea  
 SOURCE: Repub. Korean Kongkae Taeho Kongbo, No pp. given  
 CODEN: KRXXA7  
 DOCUMENT TYPE: Patent  
 LANGUAGE: Korean  
 INT. PATENT CLASSIF.:  
     MAIN: H01M010-38  
 CLASSIFICATION: 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
-----	----	-----	-----	
KR 2001037901	A	20010515	KR 1999-45645	19991020
PRIORITY APPLN. INFO.:				19991020
				20

## PATENT CLASSIFICATION CODES:

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
-----	----	-----
KR 2001037901	ICM	H01M010-38
	IPCI	H01M0010-38 [ICM,7]; H01M0010-36 [ICM,7,C*]
	IPCR	H01M0010-36 [I,C*]; H01M0010-38 [I,A]

## ABSTRACT:

This porous polymer electrolyte has superior ionic conductivity, electrochem. stability and interfacial properties. The \*\*\*electrolyte\*\*\* composition comprises a porous polymer matrix in which an ionomer, copolymd. methyl-methacrylate and basic salt maleate, is blended with vinylidene fluoride polymer, and a liquid electrolyte consisting of Li salts in an organic solvent which infiltrates the pores of the polymer matrix. Fabrication entails blending the ionomer, copolymd. methyl-methacrylate and basic salt maleate and the vinylidene fluoride polymer using a cosolvent, obtaining a polymer film after adding a plasticizer to the blended solution for producing porous structures, casting the homogeneous solution, manufactured by adding inorg. \*\*\*materials\*\*\* to the solution, onto a glass plate and evaporating the cosolvent from the cast solution. The porous polymer \*\*\*film\*\*\* is obtained by immersing the polymer film in MeOH or Et2O, thereby selectively dissolving the plasticizer in the film, infiltrating the porous polymer film with a liquid \*\*\*electrolyte\*\*\* containing a Li salt, 5-30% based on the polymer weight. The salt is selected from Li perchlorate, Li hexafluoro phosphate, Li triflate, Li bis(trifluoro methyl-sulfonyl amide) and Li tetrafluoroborate and dissolving it in a mixed solvent, 50 to 300% based on the polymer weight. The mixed solvent can contain ethylene

\*\*\*carbonate\*\*\* , propylene carbonate, di-Me carbonate, di-Et carbonate,  $\gamma$ -butyrolactone, ethyl-Me carbonate, dimethoxy ethane, diethoxy ethane and 2-Me \*\*\*THF.\*\*\*

SUPPL. TERM: porous polymer electrolyte lithium battery  
INDEX TERM: Secondary batteries  
(lithium; porous polymer electrolyte for secondary batteries)  
INDEX TERM: Polymer electrolytes  
Porous materials  
(porous polymer electrolyte for secondary batteries)  
INDEX TERM: Fluoropolymers, uses  
ROLE: DEV (Device component use); USES (Uses)  
(porous polymer electrolyte for secondary batteries)  
INDEX TERM: 96-47-9, 2-Methyl tetrahydrofuran 96-48-0,  
 $\gamma$ -Butyrolactone 96-49-1,  
Ethylene carbonate 105-58-8, Diethyl carbonate 108-32-7, Propylene carbonate 110-71-4 616-38-6,  
Dimethyl carbonate 623-53-0,  
Ethyl-methyl carbonate 73506-93-1, Diethoxy ethane  
ROLE: DEV (Device component use); USES (Uses)  
(electrolyte containing; porous polymer electrolyte for secondary batteries with)  
INDEX TERM: 7791-03-9, Lithium perchlorate 14283-07-9, Lithium tetrafluoroborate 21324-40-3, Lithium hexafluoro phosphate 33454-82-9, Lithium triflate 90076-65-6, Lithium bis(trifluoro methyl-sulfonyl amide)  
ROLE: DEV (Device component use); USES (Uses)  
(electrolyte; porous polymer electrolyte for secondary batteries with)  
INDEX TERM: 60-29-7, uses 67-56-1, Methanol, uses  
ROLE: NUU (Other use, unclassified); USES (Uses)  
(in fabrication of porous polymer electrolyte for secondary batteries)  
INDEX TERM: 80-62-6, Methyl-methacrylate 24937-79-9, Poly(vinylidene fluoride)  
ROLE: DEV (Device component use); USES (Uses)  
(porous polymer electrolyte for secondary batteries)

L60 ANSWER 12 OF 23 HCAPLUS COPYRIGHT 2008 ACS on STN

ACCESSION NUMBER: 2001:336682 HCAPLUS Full-text

DOCUMENT NUMBER: 134:341332

ENTRY DATE: Entered STN: 11 May 2001

TITLE: Production of transparent electrically conducting film with large specific surface using porous supporting material

INVENTOR(S): Hara, Susumu; Abe, Naoto; Yakushiji, Sotaro

PATENT ASSIGNEE(S): Japan Gore Tex Inc., Japan

SOURCE: Jpn. Kokai Tokyo Koho, 13 pp.

CODEN: JKXXAF

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

INT. PATENT CLASSIF.:

MAIN: H01B005-14

SECONDARY: B32B005-18; B32B007-02; B32B027-30; C08J007-04;

5/20/2008

10/748,363

27

CLASSIFICATION: C08J009-00; C08K003-00; C08L101-00; H01B013-00  
 38-3 (Plastics Fabrication and Uses)  
 Section cross-reference(s): 76  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO. -----	KIND ----	DATE -----	APPLICATION NO. -----	DATE
JP 2001126539	A	20010511	JP 1999-305969	199910 27
PRIORITY APPLN. INFO.:				JP 1999-305969 199910 27

## PATENT CLASSIFICATION CODES:

PATENT NO. -----	CLASS	PATENT FAMILY CLASSIFICATION CODES -----
JP 2001126539	ICM	H01B005-14
	ICS	B32B005-18; B32B007-02; B32B027-30; C08J007-04; C08J009-00; C08K003-00; C08L101-00; H01B013-00
	IPCI	H01B0005-14 [ICM, 7]; B32B0005-18 [ICS, 7]; B32B0007-02 [ICS, 7]; B32B0027-30 [ICS, 7]; C08J0007-04 [ICS, 7]; C08J0009-00 [ICS, 7]; C08K0003-00 [ICS, 7]; C08L0101-00 [ICS, 7]; H01B0013-00 [ICS, 7]
	IPCR	C08J0007-00 [I,C*]; C08J0007-04 [I,A]; B32B0005-18 [I,C*]; B32B0005-18 [I,A]; B32B0007-02 [I,C*]; B32B0007-02 [I,A]; B32B0027-30 [I,C*]; B32B0027-30 [I,A]; C08J0009-00 [I,C*]; C08J0009-00 [I,A]; C08K0003-00 [I,C*]; C08K0003-00 [I,A]; C08L0101-00 [I,C*]; C08L0101-00 [I,A]; H01B0005-14 [I,C*]; H01B0005-14 [I,A]; H01B0013-00 [I,C*]; H01B0013-00 [I,A]

## ABSTRACT:

Title elec. conducting film is prepared using a porous material to support conductive inorg. compds. Thus, a transparent conductive substrate OTEC-110B-125N was laminated with a stretched porous poly(tetrafluoro ethylene) sheet coated with polyvinylbutyral composition containing indium tin oxide particles, showing surface resistivity 9.8  $\Omega$ /square, and light transmission 56% and 63% (wetting conditions).

SUPPL. TERM: porous PTFE elec conductive  
 film specific surface

INDEX TERM: Transparent films  
 (elec. conductive; preparation of transparent elec.  
 conductive film with large sp. surface using porous  
 supporting material)

INDEX TERM: Electric conductors  
 (films, transparent; preparation of transparent elec.  
 conductive film with large sp. surface using porous  
 supporting material)

INDEX TERM: Binders  
 Calcination  
 Electrolysis  
 Polymer morphology  
 Porous materials  
 (preparation of transparent elec. conductive film with

large sp. surface using porous supporting material)  
INDEX TERM: Polyvinyl butyrals  
ROLE: POF (Polymer in formulation); PRP (Properties);  
TEM (Technical or engineered material use); USES  
(Uses)  
(preparation of transparent elec. conductive film with  
large sp. surface using porous supporting material)  
INDEX TERM: Fluoropolymers, uses  
ROLE: PRP (Properties); TEM (Technical or engineered  
material use); USES (Uses)  
(preparation of transparent elec. conductive film with  
large sp. surface using porous supporting material)  
INDEX TERM: 7782-41-4, Fluorine, uses  
ROLE: TEM (Technical or engineered material use); USES  
(Uses)  
(dopant; preparation of transparent elec. conductive  
film with large sp. surface using porous supporting  
material)  
INDEX TERM: 18282-10-5, Tin dioxide  
ROLE: TEM (Technical or engineered material use); USES  
(Uses)  
(fluorine-doped; preparation of transparent elec.  
conductive film with large sp. surface using porous  
supporting material)  
INDEX TERM: 429-42-5, Tetrabutylammonium tetrafluoroborate  
ROLE: NUU (Other use, unclassified); USES (Uses)  
(preparation of transparent elec. conductive film with  
large sp. surface using porous supporting material)  
INDEX TERM: 9002-84-0, PTFE  
ROLE: PRP (Properties); TEM (Technical or engineered  
material use); USES (Uses)  
(preparation of transparent elec. conductive film with  
large sp. surface using porous supporting material)  
INDEX TERM: 1314-13-2, Zinc oxide, uses 12673-86-8, Antimony tin  
oxide 50926-11-9, ITO 337912-56-8, OTEC 110B125N  
ROLE: TEM (Technical or engineered material use); USES  
(Uses)  
(preparation of transparent elec. conductive film with  
large sp. surface using porous supporting material)

L60 ANSWER 13 OF 23 COMPENDEX COPYRIGHT 2008 EEI on STN

ACCESSION NUMBER: 2002(24):1758 COMPENDEX Full-text

TITLE: Macroporous morphology of titania  
films prepared by sol-gel dip-coating method  
from a system containing poly(ethylene glycol)  
and poly(vinylpyrrolidone).

AUTHOR: Kajihara, Koichi (HTEAMP Exploratory Res. for  
Adv. Technology Japan Science and Technology  
Corp., Kawasaki 213-0012, Japan); Nakanishi,  
Kazuki

SOURCE: Journal of Materials Research v 16 n 1 January  
2001 2001.p 58-66

SOURCE: Journal of Materials Research v 16 n 1 January  
2001 2001.p 58-66

CODEN: JMRREE ISSN: 0884-2914

PUBLICATION YEAR: 2001

DOCUMENT TYPE: Journal

TREATMENT CODE: Theoretical; Experimental

LANGUAGE: English

ABSTRACT: Macroporous titania (TiO<sub>2</sub>) films were prepared by a sol-gel dip coating

method from a system containing poly(ethylene glycol) (PEG) and poly(vinylpyrrolidone) (PVP). The thickness of the macroporous films increased with an increase in PVP concentration, but the excess incorporation of PVP suppressed the macroscopic phase separation and enhanced the formation of macroscopic cracks. The porosity and the domain size were simply determined by PEG concentration. Although both PEG and PVP are hydrogen-bonding polymers having proton-accepting ability, preparation of macroporous TiO<sub>2</sub> films was unsuccessful in systems containing only PVP as a polymer. Macroporous TiO<sub>2</sub> films having interconnected pore structure as thick as 1 μm were successfully prepared by repeating the deposition several times. 31 Refs. CLASSIFICATION CODE: 714.2 Semiconductor Devices and Integrated

Circuits; 542.3 Titanium and Alloys; 931.2  
Physical Properties of Gases, Liquids and  
Solids; 804 Chemical Products Generally; 815.1.1  
Organic Polymers; 813.2 Coating Materials  
CONTROLLED TERM: \*Thick films; Pore size; Morphology;  
Protons; Microcracking; Microporosity; Hydrogen  
bonds; Titanium; Microporous materials;  
Sol-gels; Polyethylene glycols; Plastic coatings  
SUPPLEMENTARY TERM: Macroporous titania films  
ELEMENT TERM: O\*Ti; TiO; Ti cp; cp; O cp

L60 ANSWER 14 OF 23 JAPIO (C) 2008 JPO on STN  
ACCESSION NUMBER: 1999-339866 JAPIO Full-text  
TITLE: PHOTOELECTRIC CONVERSION ELEMENT AND PIGMENT  
SENSITIZING SOLAR BATTERY  
INVENTOR: INOUE YUKO; OBATA TAKATSUGU; KAN REIGEN; YONEDA  
TETSUYA; UI KOICHI  
PATENT ASSIGNEE(S): SHARP CORP  
PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC
JP 11339866	A	19991210	Heisei	H01M014-00

## APPLICATION INFORMATION

STN FORMAT: JP 1998-146790 19980528  
ORIGINAL: JP10146790 Heisei  
PRIORITY APPLN. INFO.: JP 1998-146790 19980528  
SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined  
Applications, Vol. 1999

## INT. PATENT CLASSIF.:

MAIN: H01M014-00  
SECONDARY: H01L031-04

## ABSTRACT:

PROBLEM TO BE SOLVED: To reduce a leakage of an electrode and prevent a short circuit between a working film and a counter electrode by providing a working electrode having a semiconductor film covered with a pigment, the counter electrode arranged to face it, and a solid film made of a polymer porous film pinched between them, and holding the electrolyte in the voids of the solid film. SOLUTION: A working electrode 10 is provided with a light transmitting conductive layer 2 provided on the surface of a glass 1 and a semiconductor layer 3 covered with a pigment on it to form a photo-electrode. A counter electrode 11 is provided with a light transmitting conductive layer 7 carrying platinum 6 on the surface of a glass 8. An electrolyte 4 is filled in the voids of the semiconductor layer 3 and a solid layer 5 made of a polymer porous film. The polymer porous film made of polyethylene can be used for the solid layer 5. A semiconductor adsorbing the pigment is not limited in particular as far as it

is generally used as a photoelectric converting material, and titanium oxide or zinc oxide can be used, for example. COPYRIGHT: (C)1999,JPO

L60 ANSWER 15 OF 23 JAPIO (C) 2008 JPO on STN  
ACCESSION NUMBER: 1999-080395 JAPIO Full-text  
TITLE: POROUS FILM AND SEPARATOR FOR NONAQUEOUS  
ELECTROLYTE CELL OR BATTERY  
INVENTOR: TOJO YASUHISA; HIGUCHI HIROYUKI  
PATENT ASSIGNEE(S): NITTO DENKO CORP  
PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC
JP 11080395	A	19990326	Heisei	C08J009-00

## APPLICATION INFORMATION

STN FORMAT: JP 1997-243917 19970909  
ORIGINAL: JP09243917 Heisei  
PRIORITY APPLN. INFO.: JP 1997-243917 19970909  
SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined  
Applications, Vol. 1999  
INT. PATENT CLASSIF.:  
MAIN: C08J009-00  
SECONDARY: B32B005-18; H01M002-16; H01M002-18; H01M006-16;  
H01M010-40

## ABSTRACT:

PROBLEM TO BE SOLVED: To provide a separator for a nonaqueous electrolyte cell or battery, hardly causing internal short-circuiting due to the penetration or the like of electroconductive particles and having a high surface hardness and to obtain a porous film suitable for composing the separator. SOLUTION: This porous film having a surface protecting layer is obtained by using a polyolefin porous film such as polyethylene or polypropylene as a substrate, coating at least one surface of the substrate with a mixture containing inorganic fine particles such as aluminum oxide or silicon dioxide and a resin to be a binder and then ultrasonically treating the resultant coated substrate in ethanol.

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L60 ANSWER 16 OF 23 HCAPLUS COPYRIGHT 2008 ACS on STN  
ACCESSION NUMBER: 1997:479514 HCAPLUS Full-text  
DOCUMENT NUMBER: 127:138049  
ENTRY DATE: Entered STN: 01 Aug 1997  
TITLE: All-solid-state dye-sensitized TiO<sub>2</sub>  
solar cell with a solid polymer  
electrolyte and its long-term stability  
AUTHOR(S): Matsumoto, Masamitsu; Miyazaki, Hiromitsu;  
Kumashiro, Yoshimasa  
CORPORATE SOURCE: R&D Application Lab., Ishihara Sangyo Kaisha  
Ltd., Technical Res. Inst., Kusatsu, 525, Japan  
SOURCE: Nippon Kagaku Kaishi (1997), (7), 484-488  
CODEN: NKAKB8; ISSN: 0369-4577  
PUBLISHER: Nippon Kagakkai  
DOCUMENT TYPE: Journal  
LANGUAGE: Japanese  
CLASSIFICATION: 52-2 (Electrochemical, Radiational, and Thermal  
Energy Technology)  
Section cross-reference(s): 38  
ABSTRACT:

An all solid-state dye-sensitized TiO<sub>2</sub> photoelectrochem. cell was fabricated with solid polymer electrolyte. Oligoethylene glycol methacrylate (MEO) and lithium iodide were used as a solid polymer \*\*\*electrolyte\*\*\*. Ethylene glycol (E.G.) or propylene \*\*\*carbonate\*\*\* (P.C.) was added to the polymer to enhance the performance. In order to make a tight contact with the TiO<sub>2</sub> \*\*\*porous\*\*\* film, the solid polymer \*\*\*electrolyte\*\*\* was polymerized after immersing the porous film in the monomer solution. The elec. conductivity of polymer solid electrolytes was found to be over 1 mS cm<sup>-1</sup>. The short circuit current of the cell which contained P.C. was two times higher than the one containing E.G. The cell in which MEO was polymerized by thermal radical polymerization exhibited better current-voltage characteristics than that produced by photo induced radical polymerization. For the cell prepared by thermal radical polymerization with P.C., the open circuit voltage, short circuit current, fill factor, and energy conversion efficiency were 0.63 V, 2.54 mA/cm<sup>2</sup>, 0.69, and 1.72%, resp. under photo irradiation of 1000 W/m<sup>2</sup>. A continuous photo irradiation test was carried out with a UV- and IR-filtered 150 W halogen lamp for over 8000 h. Though in the initial 2000 h the short circuit current decreased to 70%, no further decrease was observed by the elongated irradiation, proving the stability of the sensitizing dye. No leakage of the \*\*\*electrolyte\*\*\* was observed during this test. The long-term durability of the cell was enhanced dramatically.

SUPPL. TERM: solar photoelectrochem cell dye sensitized titania  
INDEX TERM: Photoelectrochemical cells  
(all-solid-state dye-sensitized TiO<sub>2</sub>  
solar cell with a solid polymer electrolyte  
and its long-term stability)  
INDEX TERM: 13463-67-7, Titania, uses  
ROLE: DEV (Device component use); USES (Uses)  
(all-solid-state dye-sensitized TiO<sub>2</sub>  
solar cell with a solid polymer electrolyte  
and its long-term stability)  
INDEX TERM: 107-21-1, Ethylene glycol, uses 108-32-7,  
Propylene carbonate  
ROLE: MOA (Modifier or additive use); USES (Uses)  
(electrolyte containing; all-solid-state  
dye-sensitized TiO<sub>2</sub> solar cell with a  
solid polymer electrolyte and its  
long-term stability)  
INDEX TERM: 10377-51-2, Lithium iodide  
ROLE: DEV (Device component use); USES (Uses)  
(electrolyte; all-solid-state  
dye-sensitized TiO<sub>2</sub> solar cell with a  
solid polymer electrolyte and its  
long-term stability)  
INDEX TERM: 9056-77-3, Polyethylene glycol methacrylate  
ROLE: DEV (Device component use); USES (Uses)  
(oligo-, electrolyte; all-solid-state  
dye-sensitized TiO<sub>2</sub> solar cell with a  
solid polymer electrolyte and its  
long-term stability)

L60 ANSWER 17 OF 23 COMPENDEX COPYRIGHT 2008 EEI on STN DUPLICATE 3  
ACCESSION NUMBER: 1997(10):915 COMPENDEX Full-text  
TITLE: Dye sensitized TiO<sub>2</sub>  
photoelectrochemical cell constructed with

polymer solid electrolyte.

AUTHOR: Matsumoto, M. (R&D Lab of Functional Material  
Div Ishihara Sangyo Kaisha, Shiga, Jpn);  
Miyazaki, H.; Matsuhira, K.; Kumashiro, Y.;  
Takaoka, Y.

SOURCE: Solid State Ionics v 89 n 3-4 Aug 2 1996.p  
263-267

SOURCE: Solid State Ionics v 89 n 3-4 Aug 2 1996.p  
263-267  
CODEN: SSIOD3 ISSN: 0167-2738

PUBLICATION YEAR: 1996

DOCUMENT TYPE: Journal

TREATMENT CODE: Experimental; Application

LANGUAGE: English

ABSTRACT: We report the first all solid-state dye sensitized TiO<sub>2</sub>  
photoelectrochemical cell with polymer solid electrolyte. Oligoethylene glycol  
methacrylate was used as a polymer solid electrolyte. Ethylene glycol and lithium  
iodide were added to it to enhance the performance. In order to make a tight contact  
with the TiO<sub>2</sub> porous film, the polymer solid electrolyte was prepared by radical  
polymerization after immersing the porous film in the monomer solution. This polymer  
electrolyte junction cell shows continuous photocurrent. The conversion efficiency  
of the cell was 0.49% for irradiation of 1000 W/m<sup>2</sup>. (Author abstract) 10 Refs.

CLASSIFICATION CODE: 702.1 Electric Batteries; 741.3 Optical Devices  
and Systems; 804.2 Inorganic Components; 815.1.1  
Organic Polymers; 701.1 Electricity: Basic  
Concepts and Phenomena; 714.2 Semiconductor  
Devices and Integrated Circuits

CONTROLLED TERM: \*Photoelectrochemical cells; Titanium  
oxides; Polyesters; Free radical  
polymerization; Porous materials; Thin films;  
Photoelectricity; Solid electrolytes

SUPPLEMENTARY TERM: Polymer solid electrolyte;  
Oligoethylene glycol methacrylate; Porous film;  
Photocurrent

ELEMENT TERM: O\*Ti; TiO<sub>2</sub>; Ti cp; cp; O cp

L60 ANSWER 18 OF 23 JAPIO (C) 2008 JPO on STN

ACCESSION NUMBER: 1995-065624 JAPIO Full-text

TITLE: PROTON CONDUCTIVE THIN FILM ELECTROLYTE

INVENTOR: KOSEKI KEIICHI; IWASAKI HIROYUKI; IZUMI YUZO;  
OTO NATSUKO; SAKURADA SATOSHI

PATENT ASSIGNEE(S): TONEN CORP

PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC
JP 07065624	A	19950310	Heisei	H01B001-06

## APPLICATION INFORMATION

STN FORMAT: JP 1993-214472 19930830

ORIGINAL: JP05214472 Heisei

PRIORITY APPLN. INFO.: JP 1993-214472 19930830

SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined  
Applications, Vol. 1995

INT. PATENT CLASSIF.:  
MAIN: H01B001-06  
SECONDARY: C08K003-00; C08L101-00; H01M008-02; H01M008-10

ABSTRACT:

PURPOSE: To improve the ion conductivity of a thin film electrolyte.

CONSTITUTION: A proton conductive solid electrolyte [H<SB>3</SB>PO<SB>4</SB>(WO<SB>3</SB>)<SB>12</SB>/29H<SB>2</SB>O, ZrO(H<SB>2</SB>SO<SB>4</SB>)<SB>2</SB>/7H<SB>2</SB>O, H<SB>3</SB>OUO<SB>2</SB>PO<SB>4</SB>/3H<SB>2</SB>O, etc.] is contained in or held by a high polymer fine porous film (normally, a carrier of alumina or the like is used,) and a proton conductive electrolytic solution is filled in the voids and is fixed. Ion conductivity level of no less than 10<SP>-3</SP>S/cm is thus achieved. COPYRIGHT: (C)1995,JPO

L60 ANSWER 19 OF 23 JAPIO (C) 2008 JPO on STN  
ACCESSION NUMBER: 1984-094383 JAPIO Full-text  
TITLE: AIR BATTERY  
INVENTOR: SUZUKI NOBUKAZU; IMAI ATSUO; TAKAMURA TSUTOMU  
PATENT ASSIGNEE(S): TOSHIBA CORP  
PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC
JP 59094383	A	19840531	Showa	H01M012-06

## APPLICATION INFORMATION

STN FORMAT: JP 1982-202035 19821119  
ORIGINAL: JP57202035 Showa  
PRIORITY APPLN. INFO.: JP 1982-202035 19821119  
SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1984

## INT. PATENT CLASSIF.:

MAIN: H01M012-06

## ABSTRACT:

PURPOSE: To provide an air battery that restricts the permeation of steam and carbonic acid gas in the air into the inner part, enables discharge for a long period of time, has excellent retention characteristics, and fully prevents the leakage of an alkaline electrolyte by using a composite film with excellent oxygen gas selection transmission capacity. CONSTITUTION: The air hole 8 of a metal air battery is blocked up from the inner part of the battery by using a composite film 9 with two-layer structure in which a thin layer made of metal oxide provided with oxygen adsorption capacity is integrally attached to one side of a porous film with micropores of 0.1μm or less in pore diameter. For example, such a porous film can include a porous fluororesin film, porous polycarbonate film, porous cellulose ester film, and porous polyethylene film. A metal oxide with rutile crystal structure is represented by a chemical expression AO<SB>2</SB>. The oxide whose coordination polyhedron is a regular octahedron shares the edge of the octahedron and combines an aggregate that is arranged unidimensionally, and, to be concrete, can include tin dioxide, titanium dioxide, vanadium dioxide, etc. Through this composite film has an extremely thin thickness, it will not transmit steam in the air. As a result, the film has an excellent oxygen gas selection transmission capacity.

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L60 ANSWER 20 OF 23 JAPIO (C) 2008 JPO on STN  
ACCESSION NUMBER: 1984-094382 JAPIO Full-text  
TITLE: AIR BATTERY  
INVENTOR: SUZUKI NOBUKAZU; IMAI ATSUO; TAKAMURA TSUTOMU  
PATENT ASSIGNEE(S): TOSHIBA CORP  
PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC
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JP 59094382      A      19840531    Showa    H01M012-06

## APPLICATION INFORMATION

STN FORMAT:      JP 1982-202034      19821119  
ORIGINAL:      JP57202034      Showa  
PRIORITY APPLN. INFO.:    JP 1982-202034      19821119  
SOURCE:      PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined  
Applications, Vol. 1984

## INT. PATENT CLASSIF.:

MAIN:      H01M012-06

## ABSTRACT:

PURPOSE: To provide an air battery that restricts the permeation of steam and carbonic acid gas in the air into the inner part, enables discharge for a long period of time, has excellent retention characteristics, and fully prevents the leakage of an alkaline electrolyte by using a composite film with excellent oxygen gas selection transmission capacity. CONSTITUTION: The air hole 8 of a metal air battery is blocked up from the inner part of the battery by using a composite film 9 with two-layer structure in which a thin layer made of metal oxide provided with oxygen adsorption capacity is integrally attached to one side of a porous film with micropores of 0.1 $\mu$ m or less in pore diameter. For example, such a porous film can include a porous fluororesin film, porous polycarbonate film, porous cellulose ester film, and polyethylene film. A metal oxide containing water or hydrate can include tin dioxide, zinc oxide, aluminum oxide, manganese oxide, calcium oxide, strontium oxide, barium oxide, titanium dioxide, silicate dioxide, and such. Though this composite film has an extremely thin thickness, it will not transmit steam in the air. As a result, the film has an excellent oxygen gas selection transmission capacity.  
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L60 ANSWER 21 OF 23    JAPIO    (C) 2008 JPO    on STN

ACCESSION NUMBER:      1983-018871      JAPIO    Full-text  
TITLE:      ZINC-NICKEL BATTERY  
INVENTOR:      IKEDA HIROTAKA; TAKEUCHI KENICHI; SHIROSAKI ISAO  
PATENT ASSIGNEE(S):      YUASA BATTERY CO LTD  
PATENT INFORMATION:

PATENT NO      KIND      DATE      ERA      MAIN IPC  
-----  
JP 58018871      A      19830203    Showa    H01M002-16

## APPLICATION INFORMATION

STN FORMAT:      JP 1981-118057      19810727  
ORIGINAL:      JP56118057      Showa  
PRIORITY APPLN. INFO.:    JP 1981-118057      19810727  
SOURCE:      PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined  
Applications, Vol. 1983

## INT. PATENT CLASSIF.:

MAIN:      H01M002-16

## ABSTRACT:

PURPOSE: To increase the oxygen-gas absorbing function of a negative zinc electrode, and extend the charge-and-discharge cycle life of a zinc-nickel battery by providing the separator of the battery with hydrophobic film parts. CONSTITUTION: A separator is prepared by providing a plural number of holes 2 with 1mm $\phi$  or less; in a porous titanium-oxide film 1 which is bound with a non-woven nylon fabric, two pieces of porous expanded polypropylene films and

polytetrafluoroethylene powder, and superposing punched disk-like porous 3mm $\phi$ ; polytetrafluoroethylene powder, and superposing punched disk-like porous 3mm $\phi$ ; polytetrafluoroethylene films 3 over the holes 2, being followed by making the films 3 to be in close contact with the sheet of the porous titanium-oxide film 1 so that the levels of the films 3 becomes the same as that of the above sheet by means of a pressing tool 4. The distance (L) between the holes 2 is made in the range of 2 $\sim$ 15cm, since only a small effect can be realized when the distance (L) is above 15cm, and an effective area having an ionic conductivity decreases when the distance (L) is below 2cm. In addition, the hole diameter of the porous hydrophilic film 1 is restricted within the range of 0.1 $\sim$ 5mm $\phi$ ; the diameter of the porous hydrophobic films is restricted within the range of 0.2 $\sim$ 10mm $\phi$ ; and the porous hydrophobic films are made larger than the holes of the porous hydrophilic film 1.

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L60 ANSWER 22 OF 23 JAPIO (C) 2008 JPO on STN

ACCESSION NUMBER: 2003-173769 JAPIO [Full-text](#)  
TITLE: NONAQUEOUS ELECTROLYTE SECONDARY BATTERY

INVENTOR: SAITO SATORU  
PATENT ASSIGNEE(S): JAPAN STORAGE BATTERY CO LTD  
PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC
JP 2003173769	A	20030620	Heisei	H01M004-02

#### APPLICATION INFORMATION

STN FORMAT: JP 2001-371510 20011205  
ORIGINAL: JP2001371510 Heisei  
PRIORITY APPLN. INFO.: JP 2001-371510 20011205  
SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 2003

#### INT. PATENT CLASSIF.:

MAIN: H01M004-02  
SECONDARY: H01M002-16; H01M010-40

#### ABSTRACT:

PROBLEM TO BE SOLVED: To aim at improvement of safety and discharging characteristics of a nonaqueous electrolyte secondary battery.

SOLUTION: With the nonaqueous electrolyte secondary battery provided with positive electrode combined agent layers 15 including positive electrode active material 15 and negative electrode combined agent layers 19 including negative electrode active material and provided with a porous polymer film 5 between each positive electrode combined agent layer 15 and the negative electrode combined agent layer 19, at least either the positive electrode combined agent layer 15 or the negative electrode combined agent layer 19 is structured to include inorganic solid electrolyte powder. Further, a porous polymer can be contained in at least either the positive electrode combined agent layer 15 or the negative electrode combined agent layer 19. Inorganic solid

electrolyte can be contained in the porous polymer film 5 between the positive electrode combined agent layer 15 and the negative electrode combined agent layer 19.

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L60 ANSWER 23 OF 23 JAPIO (C) 2008 JPO on STN

ACCESSION NUMBER: 2003-051305 JAPIO [Full-text](#)

5/20/2008

10/748,363

36

TITLE: ELECTRODE FOR NONAQUEOUS ELECTROLYTE  
BATTERY, ITS MANUFACTURING METHOD AND NONAQUEOUS  
ELECTROLYTE BATTERY USING THE SAME

INVENTOR: TAKADA KAZUNORI; KONDO SHIGEO; WATANABE JUN;  
SUGANO RIYOUJI; INADA TARO; KAJIYAMA AKIHISA;  
SASAKI HIDEKI

PATENT ASSIGNEE(S): JAPAN STORAGE BATTERY CO LTD  
NATIONAL INSTITUTE FOR MATERIALS SCIENCE  
DENKI KAGAKU KOGYO KK  
TODA KOGYO CORP

PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC
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JP 2003051305	A	20030221	Heisei	H01M004-02
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## APPLICATION INFORMATION

STN FORMAT: JP 2001-238408 20010806  
ORIGINAL: JP2001238408 Heisei  
PRIORITY APPLN. INFO.: JP 2001-238408 20010806  
SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined  
Applications, Vol. 2003

INT. PATENT CLASSIF.:  
MAIN: H01M004-02  
SECONDARY: H01M004-04; H01M010-40

## ABSTRACT:

PROBLEM TO BE SOLVED: To provide a fully solid nonaqueous electrolyte secondary battery having high safety and high performance.  
SOLUTION: This electrode for the nonaqueous electrolyte battery is characterized by having an electrode active material coated with a porous polymer film, and an inorganic solid electrolyte. The manufacturing method thereof is characterized by carrying out a pore forming treatment after immersing the active material in a polymer solution followed by a pressing process after mixing the active material with the inorganic solid electrolyte.  
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(FILE 'HOME' ENTERED AT 11:43:23 ON 20 MAY 2008)

FILE 'HCAPLUS' ENTERED AT 11:43:49 ON 20 MAY 2008

L1 1 SEA ABB=ON PLU=ON US20040214088/PN  
D SCA  
D IALL  
SEL RN

FILE 'REGISTRY' ENTERED AT 11:44:22 ON 20 MAY 2008

L2 43 SEA ABB=ON PLU=ON (105-58-8/BI OR 107-31-3/BI OR  
108-32-7/BI OR 109-94-4/BI OR 109-99-9/BI OR 110-71-4/BI  
OR 12003-67-7/BI OR 1344-28-1/BI OR 13463-67-7/BI OR  
14283-07-9/BI OR 14807-96-6/BI OR 21324-40-3/BI OR  
24937-79-9/BI OR 25014-41-9/BI OR 25322-68-3/BI OR  
25322-69-4/BI OR 28960-88-5/BI OR 33454-82-9/BI OR  
616-38-6/BI OR 623-53-0/BI OR 67-64-1/BI OR 67-68-5/BI  
OR 68-12-2/BI OR 7631-86-9/BI OR 7791-03-9/BI OR

872-50-4/BI OR 9002-84-0/BI OR 9002-86-2/BI OR 9002-88-4/  
 BI OR 9003-07-0/BI OR 9003-20-7/BI OR 9003-21-8/BI OR  
 9003-32-1/BI OR 9003-42-3/BI OR 9003-49-0/BI OR 9003-63-8  
 /BI OR 9004-34-6/BI OR 90076-65-6/BI OR 9011-14-7/BI OR  
 9011-17-0/BI OR 96-47-9/BI OR 96-48-0/BI OR 96-49-1/BI)  
 D SCA

FILE 'HCAPLUS' ENTERED AT 11:50:12 ON 20 MAY 2008

L3 QUE ABB=ON PLU=ON POLYMER OR COPOLYMER OR RESIN  
 HOMOPOLYMER OR TERPOLYMER  
 L4 QUE ABB=ON PLU=ON POLYETHYLENE OR PE OR POLYPROPYLENE  
 OR PP OR POLYIMIDE OR PI OR POLYSULFONE OR PSU OR  
 POLYURETHANE OR PUR  
 L5 QUE ABB=ON PLU=ON POLYVINYLCHLORIDE OR PVC OR CELLULOSE  
 OR NYLON OR POLYACRYLONITRILE OR PAN OR POLYVINYLIDENE(W  
 )FLUORIDE OR POLY(W)VINYLDENE(W)FLURIDE OR PVDF  
 L6 QUE ABB=ON PLU=ON POLYVINYLCHLORIDE OR PVC OR CELLULOSE  
 OR NYLON OR POLYACRYLONITRILE OR PAN  
 L7 QUE ABB=ON PLU=ON (POLYVINYLIDENE OR POLY(W)VINYLDENE)  
 (W)FLURIDE OR PVDF OR POLYTETRAFLUOROETHYLENE OR PTFE  
 L8 QUE ABB=ON PLU=ON (INORG# OR INORGANIC) (2A) (COMPOUND  
 OR MATERIAL OR CHEMICAL OR ADDITIVE OR AGENT)  
 L9 QUE ABB=ON PLU=ON SILICA# OR (SILICON OR SI) (W) (OXIDE#  
 OR DIOXIDE# OR OXIDIZ?) OR SIO2  
 L10 QUE ABB=ON PLU=ON TALC OR MAGNESIUM(A)SILICATE OR  
 TALCUM  
 L11 QUE ABB=ON PLU=ON ALUMINA OR AL2O3 OR (ALUMINUM OR  
 AL) (W)OXIDE#  
 L12 QUE ABB=ON PLU=ON LIALO2 OR TIO2 OR (TITANIUM OR  
 TI) (A) (OXIDE OR DIOXIDE) OR ZEOLITE OR ALUMINOSILICATE  
 L13 163398 SEA ABB=ON PLU=ON (L3 OR L4 OR L5 OR L6 OR L7) (2A) (FILM  
 OR THINFILM)  
 L14 3045 SEA ABB=ON PLU=ON (PORO? OR PORE OR PERVIOUS) (2A) L13  
 L15 336 SEA ABB=ON PLU=ON L14 AND (L8 OR L9 OR L10 OR L11 OR  
 L12)  
 L16 QUE ABB=ON PLU=ON MORPHOL?  
 L17 18 SEA ABB=ON PLU=ON L15 AND L16  
 D KWIC 1-2  
 L18 QUE ABB=ON PLU=ON ELECTROLY?  
 L19 43 SEA ABB=ON PLU=ON (L15 OR L17) AND L18  
 L20 4 SEA ABB=ON PLU=ON L17 AND L19  
 L21 QUE ABB=ON PLU=ON (ETHLENE OR PROPYLENE OR DIMETHYL OR  
 DIETHYL OR METHYLETHYL) (A) CARBONATE  
 L22 QUE ABB=ON PLU=ON TETRAHYDROFURAN OR 2(W)METHYLTETRAHYD  
 ROFURAN OR DIMETHOXYETHANE OR METHYLFORMATE OR ETHYLFORMA  
 TE OR (METHYL OR ETHYL) (A) FORMATE OR GAMMA(W) BUTYROLACTON  
 E  
 L23 7 SEA ABB=ON PLU=ON L19 AND (L21 OR L22)  
 L24 10 SEA ABB=ON PLU=ON L20 OR L23

FILE 'WPIX' ENTERED AT 12:39:08 ON 20 MAY 2008

L25 1 SEA ABB=ON PLU=ON US20040214088/PN  
 L26 2029 SEA ABB=ON PLU=ON (PORO? OR PORE OR PERVIOUS) (2A) L13  
 L27 203 SEA ABB=ON PLU=ON L26 AND (L8 OR L9 OR L10 OR L11 OR  
 L12)  
 L28 1 SEA ABB=ON PLU=ON L27 AND L16  
 L29 49 SEA ABB=ON PLU=ON (L27 OR L28) AND L18  
 L30 22 SEA ABB=ON PLU=ON (L28 OR L29) AND (L21 OR L22)  
 D L25 IFULL  
 L31 76 SEA ABB=ON PLU=ON (FIRST? OR 1ST OR 1(W)ST OR BASE OR

PRIMARY?) (2A)L26

L32 41 SEA ABB=ON PLU=ON (MULTI OR MULTIPL? OR PLURAL? OR TWO  
OR THREE OR NUMEROUS? OR SEVERAL? OR SERIES?) (2A)L26

L33 1 SEA ABB=ON PLU=ON L30 AND (L31 OR L32)

L34 1 SEA ABB=ON PLU=ON L28 OR L33

FILE 'HCAPLUS' ENTERED AT 12:45:42 ON 20 MAY 2008

L35 1 SEA ABB=ON PLU=ON L24 AND (L31 OR L32)

FILE 'COMPENDEX' ENTERED AT 12:46:10 ON 20 MAY 2008

L36 297 SEA ABB=ON PLU=ON (PORO? OR PORE OR PERVIOUS) (2A)L13

L37 24 SEA ABB=ON PLU=ON L36 AND (L8 OR L9 OR L10 OR L11 OR  
L12)

L38 7 SEA ABB=ON PLU=ON L37 AND L16

L39 1 SEA ABB=ON PLU=ON (L37 OR L38) AND L18

L40 0 SEA ABB=ON PLU=ON (L37 OR L38 OR L39) AND (L21 OR L22)

L41 2 SEA ABB=ON PLU=ON (L37 OR L38 OR L39) AND (L31 OR L32)

L42 10 SEA ABB=ON PLU=ON L38 OR L39 OR L41

L43 3 SEA ABB=ON PLU=ON L42 AND PY<=2004

FILE 'JAPIO' ENTERED AT 13:03:15 ON 20 MAY 2008

L44 991 SEA ABB=ON PLU=ON (PORO? OR PORE OR PERVIOUS) (2A)L13

L45 33 SEA ABB=ON PLU=ON L44 AND (L8 OR L9 OR L10 OR L11 OR  
L12)

L46 0 SEA ABB=ON PLU=ON L45 AND L16

L47 7 SEA ABB=ON PLU=ON L45 AND L18

L48 0 SEA ABB=ON PLU=ON (L45 OR L47) AND (L21 OR L22)

L49 1 SEA ABB=ON PLU=ON (L45 OR L47) AND (L31 OR L32)

L50 8 SEA ABB=ON PLU=ON (L47 OR L49) AND PY<=2004

FILE 'INSPEC' ENTERED AT 13:17:21 ON 20 MAY 2008

L51 263 SEA ABB=ON PLU=ON (PORO? OR PORE OR PERVIOUS) (2A)L13

L52 41 SEA ABB=ON PLU=ON L51 AND (L8 OR L9 OR L10 OR L11 OR  
L12)

L53 10 SEA ABB=ON PLU=ON L52 AND L16

L54 4 SEA ABB=ON PLU=ON (L52 OR L53) AND L18

L55 0 SEA ABB=ON PLU=ON (L52 OR L53 OR L54) AND (L21 OR L22)

L56 3 SEA ABB=ON PLU=ON (L52 OR L53 OR L54) AND (L31 OR L32)

L57 7 SEA ABB=ON PLU=ON L54 OR L56

FILE 'WPIX' ENTERED AT 13:24:16 ON 20 MAY 2008

SEL L34 PN,AP

FILE 'HCAPLUS' ENTERED AT 13:24:31 ON 20 MAY 2008

L58 1 SEA ABB=ON PLU=ON (KR2003-26419/AP OR CN1610169/PN OR  
CN2003-10125472/AP OR JP2003-431458/AP OR JP2004327422/PN  
OR KR2004092188/PN OR KR496641/PN OR US2003-748363/AP  
OR US20040214088/PN)

L59 9 SEA ABB=ON PLU=ON L24 NOT L58

FILE 'HCAPLUS, COMPENDEX, JAPIO, INSPEC' ENTERED AT 13:25:02 ON 20  
MAY 2008

L60 23 DUP REM L59 L43 L50 L57 (4 DUPLICATES REMOVED)

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